



योजना तथा वास्तुकला विद्यालय, विजयवाड़ा

School of Planning and Architecture, Vijayawada

An Institute of National Importance, Ministry of Education Gov. of India

Department of Architecture

Course: MBEM111 - **Project Planning and Scheduling Studio** Class: I Yr MBEM - I Sem. AY 2023-24

Internal Assessment: 250

Coordinators: Dr. Kranti Kumar M

External Assessment: 250

Contact Periods/Wk: 15 periods

Total Marks: 500

Timetable: Monday, Thursday and Friday

Credits: 15

Attendance: Min 75%

Min. Passing Marks: 50% each in Internal & External Assessment, 50% in Aggregate

Objective: The intent of the course is to augment the knowledge imparted through lectures by discussion of practical cases to determine practice, critically analyse application of knowledge in professional context, experience simulated application procedure in a limited context. Live case studies are to be undertaken and various aspects of the course are taken up in the Studios. Emphasis is given to interaction with project technical staff and other stakeholders. Application of software and other IT tools on the actual real-life cases are undertaken to enable hands on experience.

The course aims to define the Project Management context with reference to building and related infrastructure project with topics on project phases, characteristics of the project life cycle, project stakeholders and project organisation their roles, responsibilities, scope and services of team members.

Description: Minimum Project requirements-

- Size: Minimum 10000 m² Built up area.
- Project Location: Easily accessible, frequent Construction site visits to be made
- Complexity: In terms of Services (HVAC, Fire Fighting, Plumbing, Electrical etc.) Innovative material and Structural complexities.
- All drawing: Architectural, Structural, and Services.
- Documents: Contract documents, Specifications, BOQs.
- Project cannot be changed in the mid-way; Groups cannot be changed for all four semesters.

Week	Description	Group/ Individual
Week – 1	Introduction to Project Planning and Scheduling Studio	Group exercise
Week – 2	Finalization of Studio Projects & Project Brief Area, usage, FAR / Area Statement, Bye laws, Soil Investigation	Group exercise
Week – 3&4	Project Appraisal: <ul style="list-style-type: none">• Architectural appraisal: Configuration of spaces, plans, sections, elevations, levels, landscaping etc.• Structural appraisal: Foundation system, Structural system, Details on structural members including sizes and material	Group exercise

	<p>specifications</p> <ul style="list-style-type: none"> • Services: Conceptual drawings, SLDs, and actual drawings showing location of services. Interaction of MEP with other aspects of project in terms of sequencing, layout etc. 	
Week – 5	<p>Construction Logic:</p> <p>Work out alternatives of construction sequence logic considering project and site constraints, design requirement, services interaction, resource requirement etc.; Study of existing approach to construction logic; Analyse strengths and weaknesses.</p> <p>Site mobilization and Project Phasing. Material storage.</p>	Group exercise
Week – 6	<p>WBS + Activity sequencing:</p> <p>Preparation of Work Breakdown Structure (WBS); Visualizing strategic breakdown of project into work packages; Identify approach of work breakdown for the project considering ease of co-ordination, cost savings etc.; Developing and presenting WBS of respective projects as a hierarchy of deliverables that collectively constitute the project; Presenting WBS in Excel with appropriate linkages.</p>	Group exercise
Week – 7	<p>Topic: Productivity data and Activity Duration:</p> <p>Taking out quantities of listed activities using BOQ and Architectural drawings. Determine activity durations based on productivity data</p>	Group exercise
Week – 8	<p>Topic: Quantity Estimations: Project Planning & Scheduling; Identification of Activities,</p> <p>Milestones and Construction Sequencing considering:</p> <ul style="list-style-type: none"> • Activities • Non work activities • Characteristics of repetitive activities and projects • Typical and non-typical activities • Repetitive and non-repetitive activities <p>Development of hierarchy of networks showing detailed activities, milestones using Excel; Calculation of quantities</p>	Group exercise
Week – 9	Review	
Week – 10	<p>Resource Estimation</p> <p>Resource and Material Management; Resource Histograms</p>	Group exercise
Week – 11	<p>Topic: Schedule Preparation</p> <p>Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation;</p>	Group exercise

	Application of Multiple Resource Allocation Procedure; Developing a revised resource-based schedule; Application of primavera.	
Week – 12	<i>Topic: Schedule Preparation</i> Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation; Application of Multiple Resource Allocation Procedure; Developing a revised resource-based schedule; Application of primavera.	Group exercise
Week – 13	<i>Topic: Resource Levelling + MSP</i> Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation; Application of Multiple Resource Allocation Procedure; Developing a revised resource-based schedule; Application of primavera	Group exercise
Week – 14	<i>Topic: Resource Levelling + Primavera</i> Resource levelling; Developing resource histograms for projects; Achieve uniform resource allocation; Application of Multiple Resource Allocation Procedure; Developing a revised resource based schedule; Application of primavera	Group exercise
Week – 15	Review	
Week – 16	Final Portfolio Review	
Week – 17	Internal Submissions	

Tentative break-up of internal assessment marks.

S. No.	Category of Evaluation	Marks %
01	Internal Assessment 1: Panel Review	10
02	Internal Assessment 2: Panel Review	15
03	Internal Assessment 3: Panel Review	15
04	Internal Assessment 4: Final Submission	10

Sd /-

Dr. Kranti Kumar M.

**SCHOOL OF PLANNING AND ARCHITECTURE, VIJAYAWADA
(LECTURE PLAN)**

Subject: **CONSTRUCTION MANAGEMNET, TOOLS AND TECHNIQUES (MBEM102)**

Class: MBEM, I Semester

Teacher: Dr. Nagaraju Kaja
Internal Marks: 50

Dept: Architecture
External Marks: 50

Number of Hours:03
Total Marks: 100

Objective: To introduce the importance of Construction Management/Project Manager in the field of Construction and to impart knowledge in the related disciplines.

SL.NO	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	REMARKS
1	Week 1	<p style="text-align: center;"><u>Introduction</u></p> <ul style="list-style-type: none"> ✓ Intro to Project Management, Management Functions ✓ Construction Industry, role in development ✓ Construction Team 	Lecture
2	Week 2	<p style="text-align: center;"><u>Management Team</u></p> <ul style="list-style-type: none"> ✓ Construction Manager-role and responsibility ✓ Causes of project failure <p style="text-align: center;">Management styles</p>	Lecture
3	Week 3	Assignment	
4	Week 4	<p style="text-align: center;"><u>Project Planning process</u></p> <ul style="list-style-type: none"> ✓ Project Planning and development ✓ Importance of planning ✓ Feasibility Studies ✓ Project Report 	Lecture
5	Week 5	<p style="text-align: center;"><u>Management Tools & Techniques</u></p> <ul style="list-style-type: none"> ✓ Scheduling, Importance, advantages ✓ Methods of Scheduling: <p style="text-align: center;">Bar Charts, Milestone Charts, Work Break down structure, Job Layout</p>	
6	Week 6	<p style="text-align: center;"><u>Networks</u></p> <ul style="list-style-type: none"> ✓ Types of Networks ✓ Rules for writing a Network ✓ Fulkerson's rule of numbering the events 	Lecture
7	Week 7	<p style="text-align: center;"><u>Networks</u></p> <ul style="list-style-type: none"> ✓ PERT ✓ CPM ✓ Critical Path <p style="text-align: center;">Diff between PERT&CPM</p>	Lecture
8	Week 8	<u>MID TERM EXAMS</u>	
9	Week 9	<p style="text-align: center;"><u>Networks</u></p> <ul style="list-style-type: none"> ✓ PERT ✓ CPM ✓ Critical Path <p style="text-align: center;">Diff between PERT&CPM</p>	Lecture

SL.NO	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	REMARKS
10	Week 10	<p style="text-align: center;"><u>Networks</u></p> <ul style="list-style-type: none"> ✓ PERT ✓ CPM ✓ Critical Path ✓ Diff between PERT&CPM 	Lecture
11	Week 11	<p style="text-align: center;"><u>Project Controlling</u></p> <ul style="list-style-type: none"> ✓ Monitoring and controlling ✓ Resource levelling & updating ✓ 	Lecture
12	Week 12	<p style="text-align: center;"><u>Site Management</u></p> <ul style="list-style-type: none"> ✓ Site Mobilization ✓ Resource management ✓ Communicating and reporting ✓ Training for Managers/Engineers ✓ 	Lecture
13	Week 13	✓ INTERNAL ASSESSMENT	
14	Week 14	✓ Revision	

Tentative Break-up of Internal Assessment:

S. No.	Categories of Evaluation	Marks	Note
1	Internal test/ Individual Assessment	15	1. Marks allotted at each stage is tentative 2. New stages or categories of evaluation may be included if and when the need arises
2	Mid Term Exam	20	
3	Seminar Presentation	15	

Reference Books:

1. Construction Engineering and Management, S Seetharaman
2. Construction Project Management, Chitkara K.K
3. Construction Project Management, Rangwala
4. Construction Planning & Management, UK Srivatsava
5. PERT & CPM Principles and applications, LS Srinath

(Nagaraju Kaja)



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Survey No.4/4, ITI Road, Vijayawada-520008, Andhra Pradesh, India

Department of Architecture

Course: MBEM113 - Quantitative Methods and Operations Research

Class: I Yr MBEM I Sem A.Y. 2023-24

Instructors: Dr. Faiz Ahmed C

Internal Assessment: 50

End Exam: 50

Contact Periods/ week: 03 periods (2L+1T)

Total Marks: 100

Time Table: Thursday - 09:00-11:45 AM

Credits: 3

Attendance: Min 75% **Min. Passing Marks:** 40% each in Internal & External Assessment, 40% in Aggregate

Objective: To strengthen the quantitative decision-making capability through delivering the analytical scientific approach to Problem solving, quantitative analysis, Operational research models & modelling process for Managerial Decision Making.

LECTURE PLAN

WEEK	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	TOPIC OF STUDIO WORK& ASSIGNMENTS / REMARKS
1	17-08-2023	Introductory lecture, discussion on the content of the modules	Lecture/Discussion/Tutorial
2	24-08-2023	Measures of Central Tendency & Dispersion, Probability concepts, Bayes Theorem & Applications Probability Distributions Binomial, Poisson, Normal & Exponential,	Lecture/Discussion/Tutorial
3	31-08-2023	Sampling & Sampling Distributions, Testing of Hypothesis. Correlation, Regression & Multivariate Analysis, Forecasting methods & Time Series Analysis. Stochastic process introduction.	Lecture/Discussion/Tutorial/Handson Demonstration using SPSS/Excel
4	07-09-2023	Decision Trees & Utility Theory, Decision Making under uncertainty, under risk, under certainty & under conflict. Game Theory.	Lecture/Discussion/Tutorial
5	14-09-2023	Assignment I	Test I
6	21-09-2023	Linear Programming; graphical, simplex method, dual simplex, Sensitivity Analysis & Duality. Integer Programming. Transportation, Transshipment & Assignment Models.	Lecture/Discussion/Tutorial
7	28-09-2023	Linear Goal Programming, Scoring Models, Fuzzy outranking	Lecture/Discussion/Tutorial/Handson Demonstration using SPSS/Excel
8	05-10-2023	MID EXAM	Mid Semester Examinations
9	12-10-2023	Introduction to concepts of AHP (Analytic Hierarchy Process) & ANP (Analytic Network Process).	Lecture/Discussion/Tutorial
10	19-10-2023	Inventory models (static, dynamic, probabilistic & stochastic), Waiting Line / Queing models steady state operation (M/M/1). Simulation concepts & applications for inventory & Q-ing situations.	Lecture/Discussion/Tutorial
11	26-10-2023	Network models; shortest route, maximal flow problem. PERT, CPM	Lecture/Discussion/Tutorial/Handson Demonstration using SPSS/Excel
12	02-11-2023	Glimpses of Metaheuristics (Tabu, Simulated Annealing & Genetic algorithm), Markov chains & Decision Processes, Sequencing	Lecture/Discussion/Tutorial

13	09-11-2023	Dynamic Programming & Nonlinear Programming (Quadratic & Geometric Programming). Case studies & applications	Lecture/Discussion/Tutorial
14	16-11-2023	Dynamic Programming & Nonlinear Programming (Quadratic & Geometric Programming). Case studies & applications	Lecture/Discussion/Tutorial/Handson Demonstration using SPSS/Excel
15	23-11-2023	Assessment III	Students Presentation
16	30-11-2023	Assessment III	Students Presentation

S. No.	Stages of Evaluation	Weightage
1	First stage: Assessment –1	15
2	Second stage: Mid-semester Examination	20
3	Third stage: Assessment –3	15
	Total	50

Suggested Readings:

1. Frederic S.Hillier, Gerald J.Liberman,2005 Introduction to Operations Research, Tata McGraw-Hill
2. Gupta M.P. and R.B. Khanna, 2004, Quantitative Techniques for Decision Making, Prentice Hall of India
3. Natarajan,A.M, Balasuramani.P,Tamilarasi, A2009 Operations Research, Pearson Education
4. Sharma J.K, 2006, Operations Research Theory and Practice, Macmillan India Ltd.
5. Wisniewski MIK, 2004, Quantitative Methods for Decision Makers, Macmillan India Ltd.
6. Rao M.R Puri MC Operational research and its applications recent trends Alled Publishers Pvt, Ltd
7. David.E. Goldberg 2007 Genetc Algorithm Pearson Education.

Course Instructors:

sd/-
(Dr. Faiz Ahmed C)

Head of Department :

sd/-
(Dr. Uma Shankar Basina)



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Department of Architecture

Course: MBEM114 - Construction Technology, Materials and Methods

Instructors: Dr. P. Siva Prasad

Class: I Yr MBEM I Sem A.Y. 2023-24

Internal Assessment: 50

External Theory Exam: 50

Total Marks: 100

Credits: 3

Contact Periods/ week: 03 periods (55 min each)

Time Table:

Attendance: Min 75%

Min. Passing Marks: 50% each in Internal & External Assessment, 50% in Aggregate

Objective: To study and understand the properties of modern construction materials used in construction such as special concretes, metals, composites, water proofing compounds, nonweathering materials, and smart materials. To study and understand the latest construction techniques applied to engineering construction for sub structure, super structure.

Out Line of the Course:

LECTURE PLAN

WEEK	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	TOPIC OF STUDIO WORK& ASSIGNMENTS / REMARKS
1	Week-1	Concretes, Behaviour of concretes – Properties and Advantages of High Strength and High Performance Concrete.	Lecture/Discussion/Studio
2	Week-2	Properties and Applications of Fibre Reinforced Concrete, self compacting concrete.	Lecture/Discussion/Studio
3	Week-3	Types of Steels – Manufacturing process of steel – Advantages of new alloy steels.	Lecture/Discussion/Studio
4	Week-4	Properties and advantages of aluminium and its products – Types of Coatings & Coatings to reinforcement – Applications of Coatings.	Lecture/Discussion/Studio
5	Week-5	Composites - Types of Plastics – Properties & Manufacturing process – Advantages of Reinforced polymers – Types of FRP – FRP on different structural elements – Applications of FRP.	Lecture/Discussion/Studio
6	Week-6	Other Materials Types and properties of Water Proofing Compounds – Types of Non-weathering Materials and its uses – Types of Flooring and Facade Materials and its application.	Lecture/Discussion/Studio
7	Week-7	Mid-Semester examination	Mid-semester examination
8	Week-8	Smart and Intelligent materials - Types and features of smart and Intelligent Materials.	Lecture/Discussion
9	Week-9	Case studies showing the applications of smart & Intelligent Materials.	Lecture/Discussion/Studio
10	Week-10	Foundation for tall buildings- Pile foundation, Raft foundation- types and applications.	Lecture/Discussion/Studio
11	Week-11	Piling techniques – Vacuum dewatering of concrete flooring – Concrete paving technology.	Lecture/Discussion/Studio

12	Week-12	Techniques of construction for continuous concreting operation in tall buildings of various shapes and varying sections.	Lecture/Discussion/Studio
13	Week-13	Erection techniques of tall structures, Large span structures.	Lecture/Discussion/Studio

14	Week-14	Launching techniques for heavy decks – in-situ prestressing in high rise structures.	Lecture/Discussion/Studio
15	Week-15	Post tensioning of slabs and transporting – Handling and erecting lightweight components on tall structures.	Lecture/Discussion/Studio

S. No.	Stages of Evaluation	Weightage
1	First stage: Assessment –1	15
2	Second stage: Mid-semester Examination	20
3	Third stage: Assessment –3	15
	Total	50

Outcome: Student will have clear picture on the properties of modern construction materials used also will gain knowledge on the latest construction techniques used in engineering construction for sub and super structure of the buildings.

Reference Books:

1. ACI Report 440.2R-02, "Guide for the design and construction of externally bonded RP systems for strengthening concrete structures", American Concrete Institute, 2002.
2. Aitkens, "High Performance Concrete", McGraw Hill, 1999
3. Ashby, M.F. and Jones. D.R.H.H. "Engineering Materials 1: An introduction to Properties, applications and designs", Elsevier Publications, 2005.
4. Deucher, K.N, Korfiatis, G.P and Ezeldin, A.S, "Materials for civil and Highway Engineers", Prentice Hall Inc., 1998.
5. Mamlouk, M.S. and Zaniewski, J.P., "Materials for Civil and Construction Engineers", Prentice Hall Inc., 1999.
6. Santhakumar. A.R., "Concrete Technology", Oxford University press, New
7. Shan Somayaji, "Civil Engineering Materials", Prentice Hall Inc., 2001
8. Shetty M. S, "Concrete Technology: Theory and Practice", S. Chand & Company Ltd., 2005.
9. Jerry Irvine, Advanced Construction Techniques, CA Rocketr, 1984
10. Robertwade Brown, "Practical foundation engineering hand book", McGraw Hill Publications, 1995.
11. Sankar, S.K. and Saraswati, S., "Construction Technology", Oxford University.

Course Instructors:

sd/-
(Dr. P. Siva Prasad)

Head of Department :

sd/-
(Dr. Uma Sankar Basina)



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Department of Architecture

Course: **MBEM115 - Advanced Building Services**

Class: 1st Yr **MBEM - I Sem.** AY 2021-22

Instructor: Dr. Uma Sankar Basina

Internal Assessment: 50

Contact Periods/Wk: 03 periods

External Assessment: 50

Timetable: Monday (1,2,3 periods)

Total Marks: 100

Attendance: Min 75%

Credits: 03

Min. Passing Marks: 50% each in Internal & External Assessment, 50% in Aggregate

Objective:

To provide exposure to students about important services like water supply, lighting, HVAC, mechanical transportation and fire safety design, execution and maintenance in important in modern day construction. Also deals with external infrastructural services, like storm water drainage, sewerage treatment etc., important in large scale construction projects for effective coordination in pre-construction and construction phases of the projects.

LECTURE PLAN

Sl. No.	Week	Topic of Class Lecture & Discussion	Class activities & Assignments
01	Week 1	Introduction to Advanced Building Services. Discussion on Syllabus. Water quality and quantity standards for water; Purification and treatment- water supply and distribution systems.	On-line Lecture
02	Week 2	Sewerage and Sewerage Treatment Plants; R.O. system for potable water; Storm water drainage for buildings; Rain water harvesting;	On-line Lecture
03	Week 3	Plumbing system for buildings-fittings and fixtures; Hydro pneumatic systems; Multi-stage pumping; Measures for effective water management; Net zero water approach; septic and sewage treatment plant.	On-line Lecture
04	Week 4	Planning electrical wiring for building; main and distribution boards; transformers and switch gears; Power distribution systems, and sub-station equipment (for large developments);	On-line Lecture
05	Week 5	Standby/captive power supply, metering; Renewable energy sources; Cogeneration systems- modern theory of light and colour, synthesis of light, definitions, luminous flux, Candela, lighting design, design for modern lighting, lighting software.	On-line Lecture
06	Week 6	Internal Assessment - 1	Internal Assessment-1
07	Week 7	HVAC: System types and components; Heating and cooling load determination; District cooling; Planning and design of ventilation; VRF, packaged air-conditioners	On-line Lecture
08	Week 8	HVAC- Chilled water plant –fan coil systems water piping; Air conditioning systems for different types of buildings.	On-line Lecture
09	Week 9	Overview of codes and standards applicable to MEP services;	On-line Lecture
10	Week 10	Fire Safety & Vertical Transportation: Causes of fire in buildings-safety regulations	On-line Lecture
11	Week 11	Mid-term Examination	--
12	Week 12	NBC-planning considerations in buildings like Non-combustible materials, construction, staircases, and A.C. systems, Special features required for physically handicapped and elderly in building types	On-line Lecture
13	Week 13	Heat and smoke detectors-dry and wet risers-Automatic sprinklers, Vertical transportation system; Elevators; travellers; escalators;	On-line Lecture
14	Week 14	Intelligent buildings-Building Automation-Smart buildings- Building services in high rise buildings-Green Buildings-Energy efficient buildings for various zones	On-line Lecture
15	Week 15	Case studies of residence, office buildings and other buildings in each zone. Access control CCTV system; Security and surveillance systems;	On-line Lecture
16	Week 16	Telecommunication and other latest technologies; Study of schematic diagrams; Operation, maintenance and planning for retrofitting of services;	On-line Lecture
17	Week 17	Internal Assessment - 2	Internal Assessment-2

Tentative break-up of internal assessment marks.

S. No.	Category of Evaluation	Marks %
01	Internal Assessment 1	15 %
02	Mid-term Examination	20 %
03	Internal Assessment 2	15 %
03	End Semester Examination	50 %

Reference Books:

1. Fair G.M., Geyer J.C. and Okun. D, "Water and waste Engineering ", Vol. II, John Wiley & sons, Inc., New York. 2008.
2. Hopkinson. R.G and Kay. J. D, "The Lighting of buildings", Faber and Faber, London, 2009.
3. "Hand book for Building Engineers in Metric systems", NBC, New Delhi, 2008.
4. "Philips Lighting in Architecture Designs", McGraw Hill, New York, 2004.
5. "Time saver Standards for Architecture Design Data", Callendar JH, McGraw Hill, 2004.
6. William H. Severns and Julian R. Fellows, "Air conditioning and refrigeration", John Wily and sons, London, 2008.

-Sd-

Dr. Uma Sankar Basina



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Department of Architecture

Course: MBEM116 - Construction Materials and Technology Lab

Instructors: Dr. P. Siva Prasad

Class: I Yr MBEM I Sem A.Y. 2023-24

Internal Assessment: 50

External Theory Exam: 50

Total Marks: 100

Credits: 4

Contact Periods/ week: 04 periods (55 min each)

Time Table:

Attendance: Min 75%

Min. Passing Marks: 50% each in Internal & External Assessment, 50% in Aggregate

Objective: A thorough knowledge of material selection through the material testing based on specification.

Out Line of the Course:

LIST OF EXPERIMENTS

WEEK	DATE	TOPIC OF CLASS LECTURE & DISCUSSION	TOPIC OF STUDIO WORK& ASSIGNMENTS / REMARKS
1	Week-1	Casting and Testing of Concrete Cubes	Demo and Experiment
2	Week-2	Casting and Testing of Concrete Cylinders	Demo and Experiment
3	Week-3	Tests on Cement	Demo and experiment
4	Week-4	Tests on Fine Aggregate and Tests on Coarse Aggregate	Demo and experiment
5	Week-5	Tests on Concrete	Demo and experiment
6	Week-6	Mix design of concrete as per IS Code	Demo and experiment
7	Week-7	Mid-Semester examination	Mid-semester examination
8	Week-8	Mix design of high-performance concrete as per IS Code.	Demo and experiment
9	Week-9	Flow Characteristics of Self Compacting concrete.	Demo and experiment
10	Week-10	Effect of minerals and chemical admixtures in concrete at fresh and hardened state with relevance to workability, strength and durability.	Demo and experiment
11	Week-11	NDT on hardened concrete – Ultra sonic Pulse Velocity Test- – Demonstration	Demo and experiment
12	Week-12	NDT on hardened concrete – Rebound Hammer Test	Demo and experiment
13	Week-13	NDT on hardened concrete – Core Extraction- – Demonstration	Demo and experiment
14	Week-14	Permeability tests on hardened concrete – Demonstration	Demo and experiment
15	Week-15	Flexural Test on Beams- Demonstration	Demo and experiment

S. No.	Stages of Evaluation	Weightage
1	First stage: Assessment –1	15
2	Second stage: Mid-semester Examination	20
3	Third stage: Assessment –3	15
	Total	50

Course Instructors:

sd/-
(Dr. P. Siva Prasad)

Head of Department :

sd/-
(Dr. Ulma Sankar Basina)

