Vidya Pratishthan's
Kamalnayan Bajaj Institute of Engineering and Technology, Baramati

Faculty of Science and Technology

Board of Studies
Civil Engineering

Syllabus

TY B. Tech. (SEM-V)
Civil Engineering

(w.e.f. AY: 2025-26)
[2023 pattern]

Syllabus: Third Year (TY B. Tech.) Civil Engineering (2023 pattern) w.e.f. A.Y.:2025-26

SEMESTER-V

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
CE23301	Design of Steel Structures	3	2	-	10	30	60	-	-	30	130	3	1	-	4
CE23302	Transportation Engg.	3	2	-	10	30	60	-	-	30	130	3	1	-	4
CE23303	Programme Elective Course	3	2	-	10	30	60	30	-	-	130	3	1	-	4
CE23052	Multi-disciplinary minor	2	2	-	20	20	50	20	-	-	110	2	1	-	3
HS23301	Universal Huma Values/ CI	2	-	-	10	-	60	-	-	-	70	2	-	-	2
OE230XX	Open Elective	2	-	-	-	-	50	-	-	-	50	2	-	-	2
OE23304	Community Engg. Project/Field Project	-	4	-	10	-	-	30	-	30	70	-	2	-	2
HS23303	Constitution of India (Audit course)														
	Total	**15**	**12**	**-**	**70**	**110**	**340**	**100**	**-**	**70**	**690**	**15**	**06**	**-**	**21**

BOS
Civil Engineering

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Vidyanagari, Baramati-41313

Programme Elective List:

CE23303a	Advanced Surveying
CE23303b	Project Management and Economics
CE23303c	Advanced Geotechnical Engineering
CE23303d	Air Pollution and Control
CE23303e	Waste Water Engineering

Honor	
CE23382	Advanced Design of Steel Structures

Syllabus: Third Year (TY B. Tech.) Civil Engineering (2023 pattern) w.e.f. AY:2025-26

SEMESTER-VI

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
CE23311	Structure Design for Reinforced Concrete	3	2	-	10	30	60	-	-	30	130	3	1	-	4
CE23312	Programme Elective Course	3	2	-	10	30	60	-	-	30	130	3	1	-	4
CE23313	Programme Elective Course	3	2	-	10	30	60	-	-	30	130	3	1	-	4
CE23052	Multi-disciplinary minor (GB& SC)	2	2	-	20	20	50	20	-	-	110	2	1	-	3
HS23311	Environment Studies	2	-	-	10	-	60	-	-	-	70	2	-	-	2
OE230XX	Open Elective	2	-	-	-	-	50	-	-	-	50	-	2	-	2
CE23315	VSEC-ETAB	--	4	-	10	-		30	30	-	70	-	2	-	2
Total		15	12	-	70	110	340	80	30	60	690	13	8	-	21

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Id No. / PU / PM / Engg / 152 / 2008

CE23312	Programme Elective Course
CE23312a	Construction Management and Finance
CE23312b	Formwork and Plumbing Engineering
CE23312c	Airport and Bridge Engineering
CE23312d	Structural Design of Bridges
CE23313	**Programme Elective Course**
CE23313a	Design of Prestressed Concrete Structures
CE23313b	Advanced Concrete Technology
CE23313c	Earthquake Engineering
CE23313d	Hydro power Engineering

Honor	
CE23392	Advanced design of concrete structures

Syllabus: Honors Subjects in Andvanced Structural Engineering [2023 patt] w.e.f. AY:2025-26															
SEMESTER-V															
Course Code	**Courses Name**	**Teaching Scheme (Hrs.)**			**Examination Scheme and Marks**							**Credits**			
		TH	**PR**	**TUT**	**Activity**	**ISE**	**ESE**	**TW**	**PR**	**OR**	**Total**	**TH**	**PR**	**TUT**	**Total**
CE23382	**Advanced Design of Concrete Structures**	3	2	-	10	20	50	20	20	-	120	3	1	-	4
Total		**3**	**2**	**-**	**10**	**20**	**50**	**20**	**20**	**-**	**120**	**3**	**1**	**-**	**4**

Syllabus: Honors Subjects in Advanced Structural Engineering [2023 patt] w.e.f. AY:2025-26															
SEMESTER-VI															
Course Code	**Courses Name**	**Teaching Scheme (Hrs.)**			**Examination Scheme and Marks**							**Credits**			
		TH	**PR**	**TUT**	**Activity**	**ISE**	**ESE**	**TW**	**PR**	**OR**	**Total**	**TH**	**PR**	**TUT**	**Total**
CE23392	**Advanced mechanics of structures**	2	2	-	20	20	50	20	20	-	130	2	1	-	3
Total		**2**	**2**	**-**	**20**	**20**	**50**	**20**	**20**	**-**	**130**	**2**	**1**	**-**	**3**

Course Name with Code: Advanced design of steel structures (HONOR-CE23382)

Teaching Scheme:	**4**	**Examination Scheme:**
TH:0 3 Hrs/week	**Credits**	**Examination Scheme:**
PR: 02 Hrs/Week		**Activity: 20 Marks**
		In Semester: 20 Marks
		End Semester: 70 Marks
		PR: 20 Marks
		TW: 20 Marks

Prerequisite:

1. Elementary Design of Steel Structures and Structural Analysis

Companion Course, if any: Laboratory Practical

Course Objectives:

The course on Advanced Design of Steel Structures acquaints the students to analyze and design steel structures as per the Indian Standard code of practice.

Course Outcomes:

After learning the course, the students should be able to:

1. Analyze and design the Castellated beam.
2. Analyze and design of Hoarding Structures.
3. Analyze and design of Cold-Form steel sections.
4. Analyze and design of Industrial Shed.
5. Analyze and design the Pre-Engineering Building (PEB).
6. Analyze and design Steel Bridges.

Course Contents

Unit I: Design of Castellated beams: (6 Hours)

Concept, fabrication of the castellated beam from rolled steel section, analyze and design of castellated beam for bending and shear as per latest code by limit state method.

Unit II: Analysis and Design of Hoarding Structures: (7 Hours)

Concept of hoarding Structures, Analysis and design of hoarding structures under dead, live, and wind load as per the latest IS:875 by limit state method.

Unit III: Design of Cold Form Steel: (7 Hours)

Introduction, advantages of cold-formed sections, load buckling, beam, axially compressed column, combined bending & compression, Tension members, Design based on testing, empirical method & examples.

Unit IV: Analysis and Design of Industrial Shed (6 Hours)

Various design guidelines of Industrial Shed by IS 800, Design of industrial shed considering gravity and wind load.

Unit IV: Analysis and Design of Pre-Engineering Building (PEB) (7 Hours)

Concept of Pre-Engineering Building (PEB), Various components of PEB, Load combinations for PEB design, Analysis and design of PEB structure using IS code.

Unit VI: Design of Steel Bridges (6 Hours)

Introduction, steel used in bridges, classification of steel bridges load & load combination, Analysis and design of girder bridge, plate girder bridges, truss bridges, gusseted connection.

Books & Other Resources:

Text books:

1.Design of Steel Structures – N. Subrhamanyan, Oxford.
2. Plastic Design of Low -rise frames, Horne, M.R., and Morris, L.J., Granada Publishing
3. Steel Structure -Design and Behaviour, Salmon, C.G., and Johnson, J.E. Harper and Row,
4. Design of Steel Structure - Duggal, Tata Mc Graw Hill.
5. Steel Design for Structural Engineers, Kuzamanovic,B.O. and Willems,N., Prentice Hall,
6. Cold-formed Steel Structures, Wie - Wen Yu., McGraw Hill Book Company, 1973.
7. Steel Structures, William McGuire, Prentice Hall, Inc., Englewood Cliffs, N.J.1986.
8. Guidelines to design cold form section by Tata Steel.
9. Design of Steel Structure- Shah and Gore, Structures Publishers, Pune

Laboratory Experiments/Assignments:

Term work shall consist of a journal containing the following design, and site visit report.
Oral examination based on term work.

1. Analysis and design of castellated beams using Finite Element software.
2. Design of hoarding structures using commercial software
3. Site visit report on PEB/Industrial shed

Activity: Assignment on each unit

Course Name with Code: Advanced Design of Concrete Structures (Honor CE23392)

Teaching Scheme:	Credits	Examination Scheme:
TH : 03 Hrs/week PR : 02 Hrs/Week	04	Activity: 20 Marks In Semester: 20 Marks End Semester: 70 Marks PR: 20 Marks TW: 20 Marks

Prerequisite:

Fundamentals of Engineering Mechanics, Mechanics of Materials, Structural Analysis and Design of Reinforced Concrete Structures.

Course Objectives:

1. This course is designed to provide understanding of IS code provisions, fundamentals of concrete design and its applications for design of various components.
2. Students should be able to understand components of reinforced concrete structures and its arrangements.
3. To introduce basic concept of prestressed concrete.

Course Outcomes:

On completion of the course, learner will be able to:

CO1: Analyze and design of flat.

CO2: Understand grid slab and ductile detailing.

CO3: Analyze and design of earth retaining structures.

CO4: Analyze and design of liquid retaining structures.

CO5: Analyze and design of foundations.

CO6: Explain the general behavior of Prestressed Concrete sections under external load.

Course Contents

Unit I: Design of Flat Slab (06 Hours)

Flat slabs, types, design methods, column and middle strip, proportioning of flat slab element, total design moment, distribution of moments, effect of pattern loading, design for shear, design of intermediate and end panel by direct method only.

Unit II: Design of Grid Slab and Ductile detailing (06 Hours)

Design of Grid Slab by I.S. code method. Detailing for earthquake resistant construction. Introduction, Cyclic behavior of concrete and reinforcement, significance of Ductility, Ductile detailing for beams, columns, beam-column joint and footing.

Unit III: Design of Earth Retaining Structures (06Hours)

Types of retaining walls, various backfill conditions, design of cantilever type retaining walls for different backfill conditions

Unit IV: Design of Liquid Retaining Structures (07 Hours)

Types of liquid retaining structures, code provisions, analysis by approximate method and by using IS code method, design of circular and rectangular water tanks resting on ground.

Unit V: Design of Combined Footing and Pile Foundation (07 Hours)

Design of combined footing, design of pile and pile cap.

Unit VI: Introduction to Prestressed concrete (07 Hours)

Materials and their characteristics, types of prestressing, Methods and various prestressing systems,

Losses of prestressed. Analysis of Rectangular and flanged beams.

Books & Other Resources:

Text books:

1. S. Unnikrishna Pillai and Devdas Menon, Reinforced Concrete Design, 3rd Edition, 2009, Tata Mcgraw Hill.
2. Advanced Reinforced Concrete Design, N Krishnaraju, CBS Publishers and Distributors.
3. Advance R. C. C. Design, S. S. Bhavikatti, New Age International Publishers.
4. Krishna Raju, N.; Prestressed Concrete Structures; TMH; Delhi.

Reference books:

1. Design of Reinforced Concrete Structures, by Ramamrutham S, Dhanpat Rai Publications.
2. Advanced Reinforced Concrete Design, P. C. Varghese, Prentice Hall of India Pvt. Ltd., New Delhi.
3. Fundamentals of Reinforced Concrete, N. C. Sinha, S.K. Roy, S. Chand & Co. Ltd, New Delhi limited, New Delhi.

IS Codes

1. IS 1893 (Part 1): 2016, Reaffirmed in 2021, Criteria for Earthquake Resistant Design of Structures - Part 1: General Provisions and Buildings, Bureau of Indian Standards, New Delhi.
2. IS 13920: 2016 Reaffirmed in 2021, Ductile Design and Detailing of Reinforced Concrete Structures Subjected to Seismic Forces - Code of Practice (First Revision), Bureau of Indian Standards, New Delhi.
3. IS: 456-2000, Indian Standard code of practice for plain and reinforced concrete, Bureau of Indian Standards, New Delhi.
4. IS: 3370-2021, Indian Standard code of practice for concrete structures for storage of liquids, Bureau of Indian Standards, New Delhi.
5. IS 1343:2012 Indian Standard Code of Practice for Prestressed Concrete - Code of Practice (Second Revision).

Laboratory Experiments

Term work consists of a journal containing the following design, drawing and site visit report. Oral examination will be based on term work.

1. Four full imperial drawing sheets showing the reinforcement details.
2. Compulsory site visits based on above syllabus. Report should contain structural details with sketches.

Activity

Activity shall consist of at least one of the following

An activity can be designed such as to enhance students learning experience. The students need to submit assignment on each unit as part of activity.