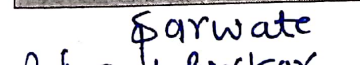
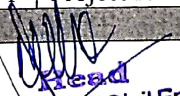


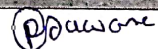
**Gondwana University**  
**B.E.**  
**VII th & VIII Sem Civil**  
**Syllabus- Model Curriculum**

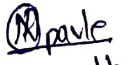
Semester VII (Final Year) Branch /Course Civil Engineering								
S1. No.	Category	Code	Course Title	Hours per week			Total contact hours	Credits
				Lecture	Tutorial	Practical		
1	Professional Core Course	PCC- 1	Structural Analysis-III	4	0	0	4	4
2	Professional Core Course	PCC- 2	Irrigation Engineering	3	1	0	4	2
3	Professional Core Course	PCC- 3	Design of RCC Structure-II	3	1	0	4	3
4	Professional Core Course	PCC- 4	Transportation Engineering II	3	1	0	4	2
<b>Lab</b>								
1	Professional Core Course	PCC-5	Irrigation Engineering	--	--	2	2	1
2	Professional Core Course	PCC-6	Software based Design of RCC Structure-II	--	--	2	2	2
3	PROJECT	PROJ-1	Project Phase - I	--	--	9	9	6
<b>Total Credit</b>								<b>20</b>

Semester VIII (Final Year) Branch /Course Civil Engineering								
S1. No.	Category	Code	Course Title	Hours per week			Total contact hours	Credits
				Lecture	Tutorial	Practical		
1	Professional Elective Course	PEC- 1	Air Pollution and Solid Waste Management	3	1	0	4	2
2	Open Elective Course	OEC- 1	Introduction to Art and Aesthetics in Civil Engineering Practices	3	0	0	3	2
3	Professional Elective Course	PEC- 2	Design of Water and Waste Water Treatment	3	1	0	4	3
4	Open Elective Course	OEC- 2	Advanced Hydraulic Structures/ Advanced RCC Design	3	1	0	4	3
<b>Lab</b>								
1	Professional Elective Course	PEC-3	Software based Design of Water and Waste Water Treatment	--	--	2	2	2
2	Open Elective Course	OEC-3	Software based Advanced Hydraulic Structures/ Advanced RCC Design	--	--	2	2	2
3	PROJECT	PROJ-1	Project Phase - II	--	--	9	2	6
<b>Total Credit</b>								<b>20</b>

  
**Prof. S. V. Borkar**  
 Assistant Professor  
 Govt. College of Engineering,  
 Chandrapur.

  
 Department of Civil Engg.  
 & Applied Mechanics  
 Govt. College of Engineering  
 Chandrapur - 442403

  
 Prasad Paware  
 final yr civil

  
 Nannath Pawle  
 final yr civil

**FACULTY OF SCIENCE AND ENGINEERING**

**Seventh Semester B.E. (Civil Engineering)**

**Course Code:**

**PCC1-CE 701**

**Title of the Course:**

**Structural Analysis-III-Theory**

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	3	4	4	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Formulation of element/local stiffness matrix and global stiffness matrix for beam members (with and without axial deformation). Continuous beams with/without sinking of support, Assembly of global/ structural stiffness matrix, Member load matrix due to concentrated load, uniformly distributed Load varying load and moment. Assembly of global/ structure load matrix up to Three Elements. Solution to problems with maximum degree of freedom Three and formulation of stiffness matrix upto DOF 6.	10 Hrs
Unit 2	Formulation of element/ local stiffness matrix and global stiffness matrix for Plane frame members (with and without axial deformation), Transformation matrix, Assembly of global/structural stiffness matrix, Member load matrix due to concentrated loads, uniformly distributed Loads, varying load, Moments. Assembly of global/ structural load matrix. Plane frame problems with maximum degree of freedom six and Solution to problems with maximum degree of freedom Three. Inclined member problems, Analysis of plane frame upto 3 DOF with support displacement.	12 Hrs
Unit 3	Basic concept, Degree of Freedom, Basic concept of Direct Stiffness Method. Formulation of elemental/local stiffness matrix and global stiffness matrix for plane truss. Transformation Matrix, Assembly of Global/ Structural stiffness matrix up to (8x8). Member load matrix including lack of fit, Support displacement and temperature. Assembly of Global/ Structure load matrix, Solution to problems with maximum degree of freedom four.	12Hrs
Unit 4	Introduction to structural dynamics, D'Alembert principle, inertia force, equation of motion (free vibration), SDOF system, Damping, natural frequency. MDOF, vibrations of undamped systems up to 2 DOF	08 Hrs
Unit 5	Introduction to finite Element method, basic concepts, discretization of structures, Minimum potential energy theorem and Rayleigh Ritz method for bar elements (prismatic/Non-prismatic), Displacement based bar elements (Prismatic/Non-prismatic). Storage techniques, Half band storage, half band width, Sky line storage.	08 Hrs

**Head**  
 Prof. S. V. Borkar *Sarwate*  
 Assistant Professor & Applied Mechanics  
 Govt. College of Engineering, *Prasad Daware*  
 Gandhinagar - 442403 *final yr civil*

*Narath Pawle*  
 Final yr civil



### Recommended books:

1. Gere and Weaver, Matrix Method of Structural Analysis, Third Edition, Von Nostrand Reinhold; New York 1990.
2. Meghree A.S. and Deshmukh S.K., Matrix Method of Structural Analysis, First Edition, Charotar Publishing House, Anand 2003.
3. Chandrupatla T.R., Belegundu A.D., Introduction to Finite Element in Engineering, Prentice Hall India, 1991.
4. Chopra A.K., Dynamics of Structure, Theory and Application of Earthquake Engineering, Third Edition, Pearson.
5. Krishnamurthy C.S., Finite Element Method, TATA McGRAW HILL.

Farwate  
Prof. S. V. Borkar  
Assistant Professor  
Govt College of Engineering,  
Chandrapur.

*[Signature]*

Head

Department of Civil Engg.  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*[Signature]*

Prasad Daware  
final yr civil

*[Signature]*

Navnath Pavle  
final yr civil





# FACULTY OF SCIENCE AND ENGINEERING

Seventh Semester B.E. (Civil Engineering)

Course Code:

PCC2-CE 702

Title of the Course:

Irrigation Engineering-Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	<p>GENERAL: Necessity and importance of Irrigation Engineering, Benefits &amp; effects of Irrigation, Classification of Irrigation, General principles of flow, lift, perennial, inundation Irrigation systems, Comparative study of sprinkler and drip Irrigation systems.</p> <p>WATER REQUIREMENT OF CROPS: Suitability of soils for Irrigation, Standards of irrigation water, PET-R method of crop water requirements, Depth and frequency of Irrigation, definitions of field capacity wilting point, available moisture, duty, delta, GCA, CCA, or depth, base period outlet factor capacity factor, time factor, root zone depth: Relation between duty and delta; Factors affecting duty, Principal crops in India, Crop rotation; Methods of assessment of Irrigation water.</p>	09 Hrs
Unit 2	<p>RESERVOIR PLANNING : Selection of site for Reservoirs; Engineering surveys, Geological and Hydrological Investigations; Fixing of LWL, FTL, TBL, HFL; Diriment storage zones in reservoir. Reservoir sedimentation</p> <p>WATER LOGGING AND LAND DRAINAGE: Causes, effects, preventive measures of water logging, types of drains, layout of tile drains systems, flow of ground water to drains.</p>	09 Hrs
Unit 3	<p>DAMS</p> <p>Classification of dams as per use, Hydraulic design and materials; Factors governing selection of type of dams.</p> <p>GRAVITY DAM: Definition; forces acting on gravity dam; stability requirements; Theoretical &amp; practical profile of gravity dam; low &amp; High dam; Galleries.</p> <p>EARTHEN DAMS: Types of earthen dam; Description of component part of earthen dams foundation, cut off trench, rock toe, hearting, central impervious core, pitching and chipping, turfing; seepage through body of earthen dam and drainage arrangements; Failure of earthen dams; Plotting of phreatic line for homogeneous earthen dams with horizontal filters; Stability of foundation against shear.</p>	09 Hrs
Unit 4	<p>CANALS:</p> <p>GENERAL: Types of canal; Alignment of canal; Cross section of Irrigation canals; Blanching depth; Schedule of area statistics, Losses in canals</p>	09 Hrs

Dr. S.V. Borkar  
Assistant Professor  
College of Engineering  
Durgam

Prasad Duware final yr civil

Dr. N. N. Pawle  
Final yr civil

	CANALS IN ALLUVIAL SOILS: Kennedy's silt theory – Design procedure – silt supporting capacity, drawbacks; Lacey's silt theory – Definition of initial final and permanent regime channels, Lacey's Regime equation, channel design procedure, drawbacks; Garret's diagram for channel design. LINED CANALS: Design procedure; Types of lining; relative merits and demerits of canal lining; Economics of canalling	
Unit 5	CANAL STRUCTURES CANAL REGULATION WORKS: Only theoretical aspects of location, objects, classification, component and schematic section of head regulator, cross regulators, canal escapes, canal falls and canal outlets. DIVERSION HEAD WORKS: Component parts of diversion headwork's – Fish ladder guide wall, divide all silt excluder and silt ejector; Causes of failure of weirs on permeable foundation;	09 Hrs

### Recommended books:-

1. Irrigation Engineering and Hydraulic Structures- Santosh Kumar Garg- khanna publication
2. Irrigation Engineering and Hydraulic Structures- S. R. Sahastrabudhe- katson publication
3. Irrigation Engineering and Water Power Engineering – B. C. Punmia-laxmi publication
4. Irrigation Engineering and Hydraulic Structures- K. R. Arora- jain year of publication
5. Irrigation Engineering- N. N. Basak- jain year of publication
6. Irrigation Engineering and Hydraulic Structures- R. K. Sharma- S. Chand publication
7. Water Resources and Irrigation Engineering – P. N. Modi

Sarwate  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering  
Chandrapur.

Head  
Prasad Daware  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403  
civil final yr

Navnath Pawle  
final yr civil

**FACULTY OF SCIENCE AND ENGINEERING****Seventh Semester B.E. (Civil Engineering)****PCC5-CE 705****Irrigation Engineering: Laboratory****Course Code:****Title of the Course:**

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

A. Detailed Design and Drawing on full sheet (A1) should be included (Minimum Five) as term work

1. Reservoir Planning – Capacity of reservoir.
2. Life of Reservoir
3. Gravity Dam – Checking of various modes.
4. Earthen Dam – Phreatic Line, Checking of foundation against shear
5. Design of canals (Lined and Unlined)
6. Design of Lift Irrigation Scheme.
7. Drawing of various canal structures

B. Detailed report of one Site visit to irrigation project in spiral binding form must be submitted with above five practical.

*Sarwate*  
(Prof. S. V. Borkar)  
Assistant Professor  
Govt College of Engineering,  
Chandrapur.

*[Signature]*  
**Head**  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*P.aware*  
Prasadaware  
final yr civil

*N.aware*  
Narnath aware  
final yr civil





Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Seventh Semester B.E. (Civil Engineering)  
PCC3-CE 703  
Design of RCC Structure-II-Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	4	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Limit state of collapse in flexure: Analysis and design of doubly reinforced rectangular, Tee and L-sections. Limit state of collapse in torsion: Concept of interaction of torsion, shear and flexure . Analysis and design of rectangular section for torsion, shear and flexure. Limit state of serviceability: Deflection calculations for beams and one way slabs.	09 Hrs
Unit 2	Analysis and design of columns subjected to biaxial moments. Design of long columns. Design of long columns. Design of isolated footing, for uniaxial and biaxial bending, for square, rectangular and circular.	09 Hrs
Unit 3	Moment redistribution Analysis and Design of Fixed beam , propped Cantilever , two –span Symmetric continuous beam	09 Hrs
Unit 4	( with LSM) Analysis and design of portal frames (single bay single story) hinged or fixed at base. Design of hinge and design of foundation. Design of combined footing 1) rectangular footing 2) strap beam footing 3) Trapezoidal footing. 4) Raft footing	09 Hrs
Unit 5	( with LSM) Design of RCC Two way slab with various end conditions using with is code coefficient. Design of RCC Cantilever and Counter fort Retaining wall.	09 Hrs

**Recommended books:**

1. Reinforced Concrete Structures, Volume 2 ,Dr. B. C. Punmia, Ashok Kr. Jain, Arun Kr. Jain, Dr. B.C. Punmia, Ashok Kr. Jain, Arun Kr. Jain-Firewall Media
2. Reinforced Concrete Design, (3rd edition) by Unni Krishna Pillai S. and DevdasMenon, Tata McGraw-Hill, 2012.
3. Reinforced Concrete (Limit State Method) Ashok Jain K., Nemchand& Bros., Roorkee, 2007.
4. Limit State theory and Design of reinforced concrete by Karve, S. R. and Dr. ShahV. L., Pune VidyarthiGrihaPrakasan, Pune, 2012.
5. Limit State Design of Foundations, (2nd edition) by Varghese P.C., PHI Learning Pvt. Ltd., New Delhi., 2008.
6. Advanced design of R.C. Structures, (2nd edition) by Bhavikatti S.S., 2009.
7. Design of concrete structures, (13th edition) by ArtherNilson H., Tata McGrawHill, 2010. Web Reference books: NPTEL
8. IS CODE: IS 456 – 2000 and 15875-1987 is permitted in the examination. Question Paper Pattern – 1) One question of 13 Marks each from Unit I, II & III 2) One question of 20 Marks each from Unit V & VI

*Sarwate*  
**Prof. S. V. Borkar**  
Assistant Professor  
Govt College of Engineering,

**Head**  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering

*Prasade*  
**Prasad Duware**  
final yr civil

*Navnath*  
**Navnath Pawle**  
Final yr civil



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Seventh Semester B.E. (Civil Engineering)  
PCC6-CE706  
Design of RCC Structure-II: Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	2	25	25	50

LIST OF EXPERIMENTS

1. Minimum three designs on theory syllabus and drawings by using relevant software

*Farwate*  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

*[Signature]*  
**Head**  
Department of Civil Engg.  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*@Prasare*  
Prasad Daware  
final yr civil

*@pavle*  
Narvath pavle  
final yr civil





Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Seventh Semester B.E. (Civil Engineering)  
PCC4-CE 704  
Transportation Engineering II- Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Railway Engineering: Permanent way, gauges, coning of wheels and tilting of rails. Rail types, wear and failure. Sleepers, rail Fixtures and fastening, ballast cushion. Traction and Tractive resistance, hauling capacity and tractive effort of locomotives.	05 Hrs
Unit 2	Geometric design of railway track, Gauge, Gradients speed, super elevation cant deficiency Negative super elevation, curves, length of transition curves, grade compensations. Points of crossings: Left and right hand turnout, design calculations for turnout & Crossover, railway track functions. Station and Yards: Types, functions facilities & equipment.	12 Hrs
Unit 3	Railway track construction, study of ballast less & magley tracks inspection & modem, techniques, of maintenance. Push through Technique. Tunnel Engineering: Tunnel alignment-Tunnel Surveys, Tunneling methods in Hard Rock and Soft Grounds, Tunnel lining. Drainage, Ventilation and lighting of tunnels, Advances in Tunneling & Tunnel Boring Mechanics, Case studies.	08 Hrs
Unit 4	Airport Engineering: Aircraft characteristics, Airport site Selection. Modem aircrafts. Airport obstructions: Zoning Laws, imaginary surfaces, Approach and turning Zone, clear zone, vert. Clearance for Highway & Railway. Runway and taxiway design: Wind rose, cross wind component, Runway Orientation and configuration. Basic runway length and correction, runway geometric design standards. Taxiway Layout and exit taxiways	09 Hrs
Unit 5	Airport layout. Airport classification: Terminal Area Aircraft parking & parking system. Unit terminal concept, Aprons, 11 Syllabus -VIII SEM Civil Engineering/ Page 20 Hangers, internationals Airports layouts, phase development. Visual Aids: AirPort marking and Lighting for runway, Taxiway and other areas. Air traffic control: Need, network, control aids, instrumental landing systems, advances in air traffic controls.	11 Hrs

Sarwate  
(S.V. Borkar)

**Text Books :**

1. Railway Engineering :Saxena and Arora, Dhanpat Rai & Sons
2. Airport Engineering :Khanna and Arora, Nem Chandra & Brothers, Roorkee.
3. Transportation Engineering : S. Srinivasan, Publishing House Charotar.

Assistant Professor  
Govt. College of Engineering  
Chandrapur.

Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasaware

Prasad Daware  
final yr civil

Pravale

Narvath Dave  
final yr civil






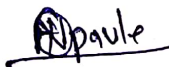
## Reference Book:

1. Airport Engineering: G. Venkatappa Rao, Tata Mc.Graw-Hill Publishing
2. Planning and Design of Airports : Robert Herorjeff, Mc.Graw-Hill Publishing
3. Railway Tracks Engineering: J.S. Mundrey, Tata Mc.Graw-Hill Publishing
4. Introduction to Tunnel Construction: David Chapman, Nicole Metje, Alfred Stark, Span Press, New York.

Sarwate  
(Prof - S. V. Borkar)  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

  
Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasawane  
Prasad Dawane  
final yr civil

  
Narnath Parle  
Final yr civil

Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Seventh Semester B.E. (Civil Engineering)  
PROJ1-CE 707  
Project phase-I

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	9	6	50	50	100

**Project phase-I shall consist of**

1. Finalization of topic
2. Review of literature
3. Synopsis with complete outline of thesis
4. Data collection if any
5. Analysis phase-I
6. Minimum Two seminars based on above work.

The project work will be a design project – experimental project – field surveying or computer oriented on any of the topics of Civil Engineering interest. It will allot as a group project consisting of a minimum THREE and maximum Six number of students, depending upon the depth of project work. The student is required to do literature survey, formulate the problem and form a methodology of arriving at the solution of the problem. The term work assessment of the project will be done at the end of the semester by a committee consisting of three faculty members from the department along with Project Guide. The students will present their project work before the committee. The complete project report is not expected at the end this semester. However a Ten pages typed report based on the work done will have to be submitted by the students to the assessing committee. The project guides will award the marks to the individual students depending on the group average awarded by the committee. One Project Guide will be allotting Maximum TWO group for guidance.

*Saxwate*  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

*[Signature]*  
Head  
Department of Civil Engg.  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*[Signature]*  
Prasad Daware  
Final yr civil

*[Signature]*  
Nannath Pawle  
Final yr civil



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
PEC1-CE 801  
Air Pollution and Solid Waste Management - Theory

Course Scheme									
Lecture	Tutorial	Practical	Periods/Week	Credits	Evaluation Scheme (Theory)				
					Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Introduction to air pollution, air pollution episodes, atmosphere and its zone, classification of air pollutants with their sources, effects of air pollutants on man, animals, plants and materials.	07 Hrs
Unit 2	Meteorological parameters affecting air pollution, lapse rate and atmospheric stability, plume behavior, wind rose, pollution rose, estimation of stack height, greenhouse effect, atmospheric ozone depletion. Ambient air sampling, stack sampling, collection of particulate and gaseous pollutants, methods of estimation.	10 Hrs
Unit 3	Air pollution control: Principles of control methods for particulates and gaseous pollutants control of air pollutants by using various equipment's. Automobile exhaust: pollutions due to diesel and petrol engines exhaust treatment and abatement. Noise pollution: Sources, ill effects, control measures.	08 Hrs
Unit 4	Introduction to solid waste management. Classification, sources, components, quantity and per capita contribution of solid waste. Physical and chemical characteristics, sampling and analysis of solid waste. Collection and transportation of solid waste: methods of collection, equipments used for collection and transportation of solid waste. Transfer stations and its economic use. Solid waste processing: methods of processing, choice of methods, merits and demerits of various methods.	10 Hrs
Unit 5	Solid waste disposal by composting: Principles, methods of composting, factors affecting composting. Solid waste disposal by sanitary land filling: site requirement, methods, leachate management. Solid waste disposal by incineration: Principles, types, merits and demerits.	10 Hrs

**Books:**

1. Air pollution by M. N. Rao and H. V. N. Rao, (Tata McGraw Hill publications)
2. Environmental Pollution Control Engineering by C. S. Rao, (Wiley Estern Ltd.)
3. Solid waste management in developing countries by A.D. Shinde and B.B. Sundersan( INSDOC, NewDelhi)
4. Air Pollution, NEERI Manual

*Saxwate*  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

*[Signature]*  
Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering

*[Signature]*  
Prasad Jaware  
Final yr civil

*[Signature]*  
Nannath Pawle  
Final yr civil



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
OEC1-CE 802  
Introduction to Art and Aesthetics in Civil Engineering Practices - Theory

Course Scheme									
Lecture	Tutorial	Practical	Periods/Week	Credits	Evaluation Scheme (Theory)				
					Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	2	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Definitions of art and aesthetics. Art: Concepts of Imitation. Symbolization, Expression, Configuration.	09 Hrs
Unit 2	Art and life: Art and society (Marxist approach), art and psyche (Freudian approach). Art as an autonomous activity, art and form.	09 Hrs
Unit 3	What is aesthetics? Theorizing about art and its relevance to creation, appreciation and criticism of art.	09 Hrs
Unit 4	Aesthetic response Rasa-theory and emotionality; detached contemplation.	07 Hrs
Unit 5	Art and Architecture: Romano-Indian Art in North- West India and Central Asia: Art under the Kushans, (Gandhara and Mathura), Buddhist Art, The Art of Kashmir, The Golden Age of Art: Art The Later Andhra Period, The Golden Age: The Gupta Period, Late Buddhist Art in India, Nepal, and Tibet.	11 Hrs

**Books:**

Rabindranath Tagore on Art and Asthetics, Orient Longmans.

The Pelican History of Arts, The Art and Architecture of India Buddhist/Hindu/Jain, Benjamin Rowland, Penguin Books.

Philosophy of Arts, An Introduction to Asthetics, Gordan Graham, Routledge, Taylor and Francis Group.

Art and Aesthetics in the Islamic Tradition, Aesthetics, Politics and Desire in Early Islam, Mohammad Hamdouni Alami, L.B. Tauris.

*Suryate*  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

**Head**  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*Prasade*  
Prasad Daware  
final yr civil

*Narath*  
Narath Pawle  
final yr civil



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
PEC2-CE 803  
Design of Water and Waste Water Treatment- theory

Lecture	Tutorial	Course Scheme			Evaluation Scheme (Theory)				
		Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Objective of water treatment, unit operation and unit processes, treatment flow, site selection for water treatment plant. Aeration: objective of aeration, types or aerators, design of cascade aerator, gas transfer, two film theory; spray aerator.	05 Hrs
Unit 2	Coagulation- Flocculation: Theory of coagulation objectives, types of rapid and slow mixing devices (hydraulic and mechanical), factors affecting coagulation and flocculation, nature and types of chemical coagulants used in water treatment, coagulant and flocculent aids. Sedimentation: Theory of sedimentation, factors affecting, types of settling, analysis of discrete and flocculent settling, design of sedimentation tank and clariflocculators.	10 Hrs
Unit 3	Filtration: mechanism of filtration, types of filters, design of rapid sand filters, filter media specifications, preparation of filter sand from stock sand, problems in filtration. Disinfection: Method of disinfection, kinetics of disinfection, types of disinfectants, Chlorination, method of chlorination (breakpoint chlorination), factors affecting efficiency of chlorination	08 Hrs
Unit 4	Treatment Methods: Waste water treatment flow sheet, preliminary, primary and secondary methods of treatment, design of screen. Grit chamber and primary settling tank.	12 Hrs
Unit 5	Biological unit processes: principle of biological treatment processes, design parameters of activated sludge process and trickling filters. Aerated lagoons, stabilization ponds, Sludge treatment, aerobic and anaerobic digestion and sludge drying beds.	10 Hrs

**Books:**

1. CPHEEO Manual of water supply & treatment
  2. CPHEEO Manual on Sewerage & sewage treatment.
  3. Water supply Engineering Vol I & II by B.C. Punmia — Laxmi Publication
  4. Wastewater Engineering by Metcalf & Eddy – Tata McGraw Hill
  5. Water Supply & Sewage by M.S. Macghee, -- Tata McGraw Hill
- Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasade  
Prasad Duwara  
final yr civil

Nannath  
Nannath  
final yr

Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
PEC3-CE 806  
Design of Water and Waste Water Treatment- Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	1	25	25	50

**Minimum five experiments**

A)

1. Determination of sulphates
2. Determination of chlorides
3. Residual available chlorination and chlorine demand
4. Determination of BOD
5. Determination of COD
6. Jar test
7. Effective size and uniformity coefficient of filter sand
8. Bacteriological test (MPN Test)

B) Design of individual unit of water or waste water treatment by using relevant software.

*Sarwate*  
Prof. S.V. Boskar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

*[Signature]*  
Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

*[Signature]*  
Prasad Daware  
final yr civil

*[Signature]*  
Nannath Paul  
final yr civil





Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
OEC2-CE 804  
Advanced Hydraulic Structures- Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	DESIGN OF WEIRS AND BARRAGES OVER PERMEABLE FOUNDATIONS : Causes of failure, Bligh's and Lane's creep theory, Khosla's theory and method of independent variables, standard profiles, corrections, exit gradient, plotting of HGL, Design of d/s and u/s protection works, length of pucca concrete floor	09 Hrs
Unit 2	SPILLWAYS : Necessity, components and classification, Estimation of spillway design flood, Energy dissipaters and its applications CANAL FALLS : Types and design principles	09 Hrs
Unit 3	CANAL REGULATION WORKS : Alignment of off taking channels, Distributaries, head regulator, cross regulator and their design, weir type and regulator type escapes, metering flumes, types of modules, Kennedy's gauge outlet	09 Hrs
Unit 4	DESIGN CONSIDERATIONS FOR CROSS DRAINAGE WORKS : Fluming the canal, Hind's method for design of transition, Design of pucca canal trough. RIVER TRAINING WORKS: Definition, classification, theoretical aspects of river training works like as Guide banks, Groynes and Spurs, Bank protection.	09 Hrs
Unit 5	HYDRAULICS OF OUTLET WORKS: Sluiceways, river intakes, simple submerged intakes, trash racks Preliminary concepts of design of stepped spillways and labyrinth weirs.	09 Hrs

**REFERENCES:**

1. Garg Santosh Kumar., Irrigation Engineering and Hydraulic Structures, John Khanna Publishers, New Delhi 2004.
- 2 Punmia B.C. and Pande B.B. Lal Irrigation and Water Power Engineering, Laxmi Publications Pvt. Ltd 2003.
3. Design of Small Dams, U.S. Bureau Reclamation, Oxford and IBH Publication Co., New Delhi 1960.

*S. V. Borkar*  
Prof. S. V. Borkar)  
Assistant Professor  
Govt. College of Engineering,

*Head*  
Department of Civil Engineering  
& Applied Mechanics  
Govt. College of Engineering

*Prasanna*  
Prasad Daware  
Final year civil

*Navnath*  
Navnath Pawle  
Final year civil



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
OEC3-CE 807  
Advanced Hydraulic Structures: Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	2	25	25	50

Any Three from the following practical to be performed:

1. Software based Analysis, Design and Drawing of Spillways with All details
2. Software based Analysis, Design and Drawing of Weir with All details
3. Software based Analysis, Design and Drawing of Barrage with All details
4. Software based Analysis, Design and Drawing of Canal Fall with All details
5. Software based Analysis, Design and Drawing of Canal Regulation Work with All details.

farwate  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

  
Head  
Department of Civil Engg.  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasud  
Prasud Daware  
final yr civil

Navnath  
Navnath Pawar  
final yr civil





Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
OEC2-CE 805  
Advanced RCC Design - Theory

Course Scheme					Evaluation Scheme (Theory)				
Lecture	Tutorial	Practical	Periods/Week	Credits	Duration of Paper Hr.	MSE	IE	ESE	Total
3	1	0	4	3	3	10	10	80	100

Unit	CONTENTS	Hours
Unit 1	Analysis and design of Multistoried buildings up to three bays, calculation of loads, Approximate analysis, Preliminary sizing, IS:875, IS:1893 recommendations, Ductile detailing.	09 Hrs
Unit 2	Analysis and Design of Elevated service Reservoirs, IS Recommendations for wind & earthquake, Ductile detailing	09 Hrs
Unit 3	Analysis and Design of bridges and Culverts. IRC Recommendations.	09 Hrs
Unit 4	Analysis and design of Silos and Bunkers. IS recommendations.	09 Hrs
Unit 5	Analysis and Design of raft foundations, Pile foundations, single pile, group of piles, Pile cap.	09 Hrs

REFERENCES:

1. Bhavikatti S. S., Advanced R. C. C. Design Volume-I & II, New age international publisher, New Delhi.
2. Krishna Raju N, Advanced R. C. C. Design, CSB Publisher and Distributor, New Delhi.
3. B.C. Punmia, Ashok K. Jain, Arun K. Jain – Reinforced Concrete Structures Vol. II, Laxmi Publications, New Delhi
4. N.C. Sinha, S.K. Roy – Fundamentals of Reinforced Concrete, S. Chand & Co. Ltd, New Delhi
5. P.C. Varghese – Advanced Reinforced Concrete Design, Prentice Hall of India Pvt. Ltd., New Delhi.
6. P. C. Varghese, Design of Reinforced concrete Foundation. PHI Learning Pvt. Ltd.
7. Ramachandra, Design of Concrete Structures Vol. I & II. Standard Book House.

Sanjay  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering,  
Chandrapur.

Prasare  
Prasad Daware  
final yr civil


Narvath  
Narvath  
Final yr civil

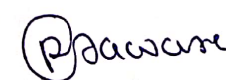


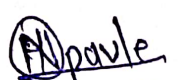


10. Ramakrishnan and P.D.Arthur, —Ultimate Strength design for structural concretel, Wheeler Publishing Co.
11. Karve S.R. and Shah V.C, —Design of reinforced cement concrete structures using Limit State Approachll, Structures Publishers.
12. Jain O.P and Jaikrishna, —Plain and reinforced concretel, Vol-II, Nemchand and Bros
13. IS: 456-2000 Indian Standard code of practice for plain and reinforced concrete, Bureau of 24/44 Indian Standards, New Delhi.
14. IS: 1893:-2002 Indian Standard Code of practice for criteria for Earthquake resistant design of Structures, Bureau of Indian Standards, New Delhi.
15. IS: 3370-Indian Standard code of practice for concrete structures for storage of liquids, Bureau of Indian standard New Delhi.

Sarwate  
 Prof - S. V. Borkar  
 Assistant Professor  
 Govt College of Engineering,  
 Chandrapur.

  
**Head**  
 Department of Civil Engg  
 & Applied Mechanics  
 Govt. College of Engineering  
 Chandrapur - 442403

  
 Prasad Daware  
 final yr civil

  
 Nannath  
 final yr



Course Code:  
Title of the Course:

FACULTY OF SCIENCE AND ENGINEERING  
Eighth Semester B.E. (Civil Engineering)  
OEC3-CE 808  
Advanced RCC Design : Laboratory

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	2	2	25	25	50

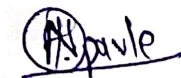
Any three detailed design and drawing from above five units.

Minimum three design assignments based on theory syllabus along with the detailed structural drawings by using relevant software

Farwate  
Prof. S. V. Borkar  
Assistant Professor  
Govt. College of Engineering,  
Chandrapur.

  
Head  
Department of Civil Engg.  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasanna  
Prasad Daware  
Final yr civil

  
Navnath  
Final yr



**FACULTY OF SCIENCE AND ENGINEERING****Eighth Semester B.E. (Civil Engineering)****PROJ1-CE809****Project phase-II****Course Code:****Title of the Course:**

Course Scheme				Evaluation Scheme (Laboratory)		
Lecture	Tutorial	Practical	Credits	TW	POE	Total
0	0	9	6	100	100	200

The project work started in the seventh semester will continue in this semester. The students will complete the project work in this semester and present it before the assessing committee. The term work assessment committee as constituted in the seventh semester will assess the various projects for the relative grading and group average. The guides will award the marks for the individual students depending on the group average. Each group will submit the copies of the completed project report signed by the guide to the department. The head of the department and college principal will certify the copies and return them to the students. One copy will be kept in the departmental library.

S. V. Borkar  
Assistant Professor  
Govt. College of Engineering  
Chandrapur.

Head  
Department of Civil Engg  
& Applied Mechanics  
Govt. College of Engineering  
Chandrapur - 442403

Prasad Daware  
final yr civil

Narath Pawle  
final yr civil

