



Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
 An Autonomous Institute
FACULTY OF ENGINEERING
DEPARTMENT OF CIVIL ENGINEERING (WP)

S.Y. B.Tech SEMESTER III

S.Y. B.Tech SEMESTER III														
Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					TOTAL	
			L	T	P	SL	Credit	Scheme	Theory		Practical			
									Max.	Min. Passing	Max	Min. Passing		
0UCWPC301	F	Numerical and Statistical Methods for Civil Engineers	3	1	0	5	4	ISE	20	40*	-	-	100	
								MSE	20					
								ESE	60					
0UCWPC302	F	Surveying and Geomatics	3	0	0	4	3	ISE	20	40*	-	-	100	
								MSE	20					
								ESE	60					
0UCWPC303	F	Mechanics of Solids	3	0	0	4	3	ISE	20	40*	-	-	100	
								MSE	20					
								ESE	60					
0UCWPC304	F	Building construction and Services	3	0	0	4	3	ISE	20	40*	-	-	100	
								MSE	20					
								ESE	60					
0UCWPC305	F	Engineering Fluid Mechanics	3	0	0	4	3	ISE	20	40*	-	-	100	
								MSE	20					
								ESE	60					
0UCWVE306	F	Environmental Studies	2	0	0	1	2	ISE	50	20*	-	-	50	
0UCWHM307	F,E	Engineering Economics	2	0	0	1	2	ISE	50	20*	-	-	50	
0UWEPC308	F,E	Surveying and Geomatics Lab	0	0	2	1	1	ISE	-	-	25	25**	50	
								ESE			25			
0UCWPC309	F	Mechanics of Solids Lab	0	0	2	1	1	ISE	-	-	25	25**	50	
								ESE			25			
0UCWPC310	F	Engineering Fluid Mechanics Lab	0	0	2	1	1	ISE	-	-	25	25**	50	
								ESE			25			
0UCWVS311	F	VSEC Lab	0	0	2	1	1	ISE	-	-	50	25**	50	
TOTAL			19	1	08	27	24	TOTAL MARKS					800	
Total Contact Hours Per Week			28											

Course Category	Program Core Course	Program Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co-curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	19	-	-	-	2	1	-	2	-	-	-	24

ISE :- In semester evaluation, MSE: - Mid Semester Examination, ESE: - End Semester Examination

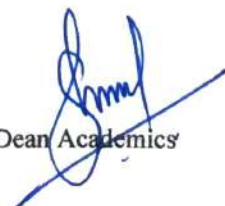
Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing

Note 2- Internship I: Students are expected to complete 60 hours of internship after the third semester, and its evaluation will be conducted in the fourth semester.


BOS Chairman




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DEPARTMENT OF CIVIL ENGINEERING (WP)

S.Y. B.Tech SEMESTER IV

S.Y. B.Tech SEMESTER IV													
Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					Total
			L	T	P	SL	Credit	Scheme	Theory		Practical		
										Max.	Min. Passing	Max.	Min. Passing
0UCWPC401	F	Advanced Concrete Technology	3	-	-	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC402	F	Building Planning and Design	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC403	F	Water Resource Engineering	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC404	F	Environmental Engineering	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWMD405	F	MDM I	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWVE406	F,E	Universal Human Values	2	0	0	3	2	ISE	50	20*	-	-	50
0UCWHM407	F	Entrepreneurship Development	2	0	0	3	2	ISE	50	20*	-	-	50
0UCWPC408	F	Advanced Concrete Technology Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWPC409	F	Building Planning and Design Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWAE410	F	Ability Enhancement Lab	0	0	2	1	1	ISE	-	-	50	25**	50
0UCWIR411	F,E	Internship-I	0	0	4	2	2	ISE	-	-	50	25**	50
TOTAL			19	0	10	31	24	TOTAL MARKS					800
Total Contact Hours Per Week			29										

Course Category	Programme Core Course	Programme Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co-curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	14	-	-	3	2	-	1	2	-	2	-	24

Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

****** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing

Total Credit in SY

SEM-III	SEM-IV	TOTAL
24	24	48

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T.Y. B.Tech SEMESTER V

Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					Total
			L	T	P	SL	Credit	Scheme	Theory		Practical		
									Max.	Min. Passing	Max.	Min. Passing	
0UCWPC501	F	Design of Steel structures	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC502	F	Geotechnical Engineering	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPE503	F	PEC I	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWOE504	F	OE I (MOOC)	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWMD505	F	MDM II	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWVE506	F	Constitution of India	2	0	0	2	2	ISE	-	-	50	20**	50
0UCWPC506	F,E	Design of Steel structures Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWPC507	F	Geotechnical Engineering Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWVS508	F	Vocational and Skill Enhancement Lab	0	0	2	1	1	ISE	-	-	50	20**	50
0UCWAE509	F	Ability Enhancement Course	2	0	0	3	2	ISE	50	20*	-	-	50
0UCWPR510	F,E	Mini Project	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE	-	-	25		
0UCWCC511	F	Co –curricular Courses	0	0	2	1	1	ISE	-	-	50	25**	50
TOTAL			19	0	10	28	24	TOTAL MARKS					850
Total Contact Hours Per Week			29			28	24						

Course Category	Programme Core Course	Programme Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co-curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	8	3	3	3	2	1	2	-	-	1	1	24

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Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing

Note 2- Internship II: Students are expected to complete 60 hours of internship after the fifth semester, and its evaluation will be conducted in the sixth semester.

BOS Chairman



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DEPARTMENT OF CIVIL ENGINEERING (WP)

T.Y. B.Tech SEMESTER VI

Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					Total
			L	T	P	SL	Credit	Scheme	Theory		Practical		
									Max.	Min. Passing	Max.	Min. Passing	
0UCWPC601	F	Design of Reinforced Concrete Structures	3	0	-	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC602	F	Transportation Engineering	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPE603	F	PEC II	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPE604	F	PEC III	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWOE605	F	OE II	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWMD606	F	MDM III	2	0	0	3	2	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWVS607	F,E	Vocational and Skill Enhancement Lab	0	0	2	1	1	ISE	-	-	50	20**	50
0UCWPC608	F	Design of Reinforced Concrete Structures Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWPC609	F	Transportation Engineering Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE			25		
0UCWPR610	F,E	Project Phase- I	0	0	4	3	2	ISE	-	-	25	25**	50
								ESE	-	-	25		
0UCWIR611		Internship-II	0	0	4	3	2	ISE	-	-	50	25**	50
TOTAL			17	0	14	32	24	TOTAL MARKS					850
Total Contact Hours Per Week			31										

Course Category	Programme Core Course	Programme Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co-curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	8	6	3	2	-	1	-	-	2	2	-	24

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Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing

Total Credit in TY

SEM-III	SEM-IV	SEM-V	SEM-VI	TOTAL
24	24	24	24	96



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DEPARTMENT OF CIVIL ENGINEERING (WP)

B.Tech SEMESTER VII

Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					TOTAL
			L	T	P	S	Credit	Scheme	Max.	Min. Passing	Max.	Min. Passing	
0UCWPC701	F	Project Estimation and Valuation	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC702	F	Construction Planning and Management	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPE703	F	PEC IV	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPE704	F	PEC V	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWMD705	F	MDM IV	3	0	0	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWPC706	F,E	Project Estimation and Valuation Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE	-	-	25		
0UCWPC707	F,E	Construction Planning and Management Lab	0	0	2	1	1	ISE	-	-	25	25**	50
								ESE	-	-	25		
0UCWPR708	F	Project Phase- II	0	0	8	6	4	ISE	-	-	50	25**	100
								ESE	-	-	50		
0UCWCC709	F,E	Co –curricular Courses	0	0	2	1	1	ISE	-	-	50	20**	50
TOTAL			15	0	14		29	22	TOTAL MARKS				750
Total Contact Hours Per Week			29										

Course Category	Programme Core Course	Programme Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co – curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	8	6	-	3	-	-	-	-	-	4	1	22

ISE :- In semester evaluation , MSE: - Mid Semester Examination, ESE: - End Semester Examination

Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing



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DEPARTMENT OF CIVIL ENGINEERING (WP)

B.Tech SEMESTER VIII

B.Tech SEMESTER VIII													
Course Code	Course Domain	Course Name	Teaching Scheme					Evaluation Scheme					Total
			L	T	P	SL	Credit	Scheme	Theory		Practical		
									Max.	Min. Passing	Max.	Min. Passing	
0UCWPE801	F	PEC VI (MOOC)	2	-	-	4	3	ISE	20	40*	-	-	100
								MSE	20				
								ESE	60				
0UCWIR802	F,E	Internship- III	-	-	2	25	8	ISE	-	-	100	50**	200
								ESE	-	-	100	50**	
TOTAL			2	0	2	29	11	TOTAL MARKS					300
Total Contact Hours Per Week			04										

Course Category	Programme Core Course	Programme Elective Course	Open Elective Course	Multi Disciplinary Minor Course	Value Education	Vocational and Skill Enhancement Course	Ability Enhancement Course	Humanities and Management Course	Internship	Project	Co-curricular Courses	Total
	PC	PE	OE	MD	VE	VS	AE	HM	IR	PR	CC	
Credit	-	3	-	-	-	-	-	-	8	-	-	11

Note1- * - ISE+MSE-40%, ESE-40% and Combined together needs to be 40% for Theory courses for passing

** - ISE-40%, ESE-50% and Combined together needs to be 50% for Lab courses for passing

Note 2- Internship III: Students are expected to complete min 240 hours of internship in the same semester.

Total Credit in BTech

SEM-I	SEM-II	SEM-III	SEM-IV	SEM-V	SEM-VI	SEM-VII	SEM-VIII	TOTAL
22/20	20/22	24	24	24	24	22	11	173

BOS Chairman



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DEPARTMENT OF CIVIL ENGINEERING (WP)

List of Course under Different Category- UG

Programme Core Courses PC

Sr. No	Course Title	Class	Semester
1	Numerical and Statistical Methods for Civil Engineers	SY	III
2	Surveying and Geomatics	SY	III
3	Mechanics of Solids	SY	III
4	Building construction and Services	SY	III
5	Engineering Fluid Mechanics	SY	III
6	Advanced Concrete Technology	SY	IV
7	Building Planning and Design	SY	IV
8	Water Resource Engineering	SY	IV
9	Environmental Engineering	SY	IV
10	Design of Steel structures	TY	V
11	Geotechnical Engineering	TY	V
12	Design of Reinforced Concrete Structures	TY	VI
13	Transportation Engineering	TY	VI
14	Project Estimation and Valuation	B.Tech	VII
15	Construction Planning and Management	B.Tech	VII

Programme Elective Courses PEC

Sr. No	Course Title	PEC	Class	Semester
1	Structural Analysis	PEC-I	TY	V
2	Environmental Modelling using GIS			
3	Environmental Engineering	PEC-II	TY	VI
4	Building Information Modelling (BIM)			
5	Advanced Water & Wastewater Treatment	PEC-III	TY	VI
6	Smart Infrastructure Systems			
7	Climate Change and Carbon Management	PEC-IV	BTech	VII
8	Disaster-Resilient Infrastructure			
9	Advance Construction Practices	PEC-V	BTech	VII
10	Advanced Foundation Engineering			
11	MOOC	PEC-VI	BTech	VIII

Multi-Disciplinary Minor (MDM)

Track 1: Environmental Engineering

MDM	Semester	Course 1	Course 2	Course 3
MDM I	IV	Environmental Science for Engineers	Fundamentals of Water & Wastewater	Ecology & Sustainable Development
MDM II	V	Water Supply & Sanitation Engineering	Solid Waste Management	Environmental Chemistry





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MDM III	VI	Industrial Pollution Control	Air & Noise Pollution Engineering	Environmental Impact Assessment
MDM IV	VII	Sustainable Environmental Systems	Smart Water Infrastructure	Climate Change & Carbon Management

Track 2: Construction Management

MDM	Semester	Course 1	Course 2	Course 3
MDM I	IV	Introduction to Construction Technology	Building Materials & Methods	Engineering Drawing for Construction
MDM II	V	Construction Planning & Scheduling	Quantity Surveying & Estimation	Construction Safety Engineering
MDM III	VI	Building Information Modeling (BIM)	Construction Equipment & Automation	Temporary Structures & Formwork
MDM IV	VII	Lean Construction & Digital Project Delivery	Advanced Construction Management	Sustainable Building Construction

Track 3: Infrastructure Engineering

MDM	Semester	Course 1	Course 2	Course 3
MDM I	IV	Fundamentals of Infrastructure Systems	Transportation Infrastructure Basics	Introduction to Urban Infrastructure
MDM II	V	Highway & Railway Engineering	Urban Infrastructure Planning	Water Resources Infrastructure
MDM III	VI	Smart Cities & Utility Infrastructure	Pavement Materials & Maintenance	Bridge Engineering Fundamentals
MDM IV	VII	Sustainable Infrastructure Design	Resilient Infrastructure Engineering	Intelligent Transportation Systems

Track 4: Project Management

MDM	Semester	Course 1	Course 2	Course 3
MDM I	IV	Principles of Project Management	Engineering Economics	Organizational Behavior for Engineers
MDM II	V	Project Planning with Primavera/MS Project	Cost Engineering & Budgeting	Resource Management
MDM III	VI	Risk, Quality & Contract Management	Procurement & Tender Management	Project Monitoring & Control
MDM IV	VII	Integrated Project Delivery	Strategic Infrastructure Project Management	Leadership & Project Governance





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Open Elective (OE)

Sr. No	Course Title	OE	Class	Semester
1	MOOC	OE-I	TY	V
2	Green Building & Sustainable Construction	OE-II	TY	VI
3	GIS and Remote Sensing for Engineers			

Vocational and Skill Enhancement Course (VSEC)

Sr.No	Course Title	Class	Semester
1	Digital Drawing and Drafting for Civil Engineering	SY	III
2	Building Information Modeling (BIM) using Autodesk Revit	TY	V
3	Primavera P6 for Construction Planning	TY	VI

Ability Enhancement Course (AEC)

Sr.No	Course Title	Class	Semester
1	Technical Communication and Professional Ethics	SY	IV
2	Innovation, Entrepreneurship and Intellectual Property Rights	TY	V

BOS Chairman



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NPTEL COURSES

Sr. No.	NPTEL	Discipline	Course Name	Week	Link
1.	NPTEL - I	Economics	Economic Environment and Business Strategy	8 weeks	https://onlinecourses.nptel.ac.in/noc25_ec16/preview
2.		Multidisciplinary	Intellectual Property Portfolio Management	8 weeks	https://onlinecourses.nptel.ac.in/noc25_ge51/preview
3.		Humanities and Social Science	Soft Skill Development	8 weeks	https://onlinecourses.nptel.ac.in/noc25_hsl42/preview
4.		Multidisciplinary	Research Methodology	8 weeks	https://onlinecourses.nptel.ac.in/noc25_ge66/preview
5.		Management	Patent Search for Engineers and Lawyers	8 weeks	https://onlinecourses.nptel.ac.in/noc25_mgl43/preview
6.		Humanities and Social Science	Energy Economics and Policy	8 weeks	https://onlinecourses.nptel.ac.in/noc25_hsl36/preview
7.		Humanities and Social Science	Developing Soft Skills and Personality	8 weeks	https://onlinecourses.nptel.ac.in/noc25_hsl74/preview
8.		Management	Marketing Management - I	8 weeks	https://onlinecourses.nptel.ac.in/noc25_mgl15/preview
9.	NPTEL - II	Management	Yoga and Positive Psychology for Managing Career and Life	8 weeks	https://onlinecourses.nptel.ac.in/noc26_mgl4/preview
10.		Management	Ethics in Engineering Practice	8 weeks	https://onlinecourses.nptel.ac.in/noc26_mgl42/preview
11.		Humanities and Social Sciences	Introduction to Psychology	8 weeks	https://onlinecourses.nptel.ac.in/noc26_hs42/preview
12.		Humanities and Social Sciences	Modernisation and Creative Communication	8 weeks	https://onlinecourses.nptel.ac.in/noc26_hs50/preview
13.		Multidisciplinary	Roadmap for Patent Creation	8 weeks	https://onlinecourses.nptel.ac.in/noc26_ge18/preview
14.		Humanities and Social Sciences	Introduction on Intellectual Property to Engineers and Technologists	8 weeks	https://onlinecourses.nptel.ac.in/noc26_hs62/preview
15.		Multidisciplinary	Industry 4.0: Managing The Digital Transformation	8 weeks	https://onlinecourses.nptel.ac.in/noc26_ge04/preview
16.		Management	Business Development: From Start to Scale	12 weeks	https://onlinecourses.nptel.ac.in/noc26_mgl50/preview
17.		Multidisciplinary	Introduction to Industry 4.0 and Industrial Internet of Things	12 weeks	https://onlinecourses.nptel.ac.in/noc26_cs38/preview

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FACULTY OF ENGINEERING
Department of Civil Engineering (WP)

Honors in Civil Engineering

Track 1-Sustainable Construction & Green Building (18 Credits)

NPTEL Courses -16 Credits				
Sr. No.	Course Name	Duration	Credit	URL
1	Sustainable Transportation systems	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce107
2	Sustainable Materials and Green Buildings	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce162
3	Sustainable Engineering Concepts and Life Cycle Analysis	8 Weeks	3	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce99
4	Fire Protection, Services and Maintenance Management of Building	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce161
5	Project Planning & Control	8 Weeks	3	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce96
6	Building Materials as a Cornerstone to Sustainability	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ar33
Project- 2 Credits				
1.	Project	Semester - 7 th	2	

Track 2- Transportation Engineering & Smart Infrastructure (18 Credits)

NPTEL Courses -16 Credits				
Sr. No.	Course Name	Duration	Credit	URL
1	Introduction to Multimodal Urban Transportation Systems (MUTS)	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce137
2	Bridge Engineering	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce136
3	Geometric Design of Highways	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce112
4	Pavement Construction Technology	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce157
5	Geotechniques of Dams, Tunnels and Underground Spaces	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce134
6	Integrated Waste Management for a Smart City	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce142





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7	Remote Sensing for Natural Hazard Studies	12 Weeks	4	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce160
Project				
1.	Project	Semester -7 th	2	-


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MULTIPLE ENTRY EXIT COURSES

Sr. No.	Year	Course Name	Course Duration	Web link
1	1 st	Assistant Surveyor	14 Hours	https://www.skillindiadigital.gov.in/courses/detail/e8092817-bcd1-491d-a2af-82f482424eb9
2	2 nd	GIS and Remote Sensing for Civil Engineers	60 Hrs	ISRO-IIRS / NPTEL Certification
3	3 rd	Sustainable Infrastructure Planning and Environmental Management	120 Hours	NPTEL / SWAYAM Certification

MULTIPLE ENTRY-EXIT COURSES

DETAILS OF COURSES

Sr. No	Year	Exit Award	Course Name	Course Duration	Certification Agency / Web Link
1	First Year	Undergraduate Certificate	Assistant Surveyor	14 Hours	https://www.skillindiadigital.gov.in/courses/detail/e8092817-bcd1-491d-a2af-82f482424eb9
2	Second Year	Undergraduate Diploma	GIS and Remote Sensing for Civil Engineers	60 Hours	ISRO-IIRS / NPTEL Certification
3	Third Year	Bachelor Degree (Research Pathway Eligible)	Sustainable Infrastructure Planning and Environmental Management	120 Hours	NPTEL / SWAYAM Certification
4	Fourth Year	B.Tech. Civil & Environmental Engineering	Degree Completion	As per Programme Curriculum	University / Autonomous Institute

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1. Assistant Surveyor (14 Hours)

Objectives:

- Understand fundamentals of chain surveying and leveling.
- Perform basic field measurements.
- Use surveying instruments safely and effectively.
- Prepare simple site plans and contour maps.

Expected Skills:

- Chain Surveying
- Compass Surveying
- Leveling Operations
- Basic Mapping

Exit Qualification:

Undergraduate Certificate in Civil Engineering Fundamentals

2. GIS and Remote Sensing for Civil Engineers (60 Hours)

Objectives:

- Introduce GIS software and spatial data handling.
- Understand remote sensing applications.
- Develop thematic maps and infrastructure databases.
- Apply GIS tools in urban and environmental planning.

Expected Skills:

- QGIS/ArcGIS Operations
- Spatial Database Development
- Infrastructure Mapping
- Environmental Monitoring

Exit Qualification:

Undergraduate Diploma in Civil Engineering

3. Sustainable Infrastructure Planning and Environmental Management (120 Hours)

Objectives:

- Apply sustainability principles in infrastructure development.
- Conduct environmental impact assessment studies.
- Understand climate-resilient infrastructure planning.
- Integrate GIS, Remote Sensing and Environmental Engineering tools.





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Expected Skills:

- Sustainability Assessment
- Environmental Impact Assessment (EIA)
- Climate Change Adaptation Planning
- Resource Management
- Green Infrastructure Design

Exit Qualification:

Bachelor Degree with Research Pathway Eligibility

Recommended NPTEL Courses for Third Year Exit:

- Sustainable Transportation Systems
- Sustainable Materials and Green Buildings
- Sustainable Engineering Concepts and Life Cycle Analysis
- Integrated Waste Management for Smart Cities
- Building Materials as a Cornerstone to Sustainability
- Plastic Waste Management

Programme Outcomes:

- Industry-ready technical skills
- Employability enhancement
- Entrepreneurial competence
- Digital engineering proficiency
- Sustainability-focused engineering practices
- Lifelong learning orientation

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Course Structure:

Class	S.Y. Sem. – III
Course Code and Course Title	OUCWPC301, Numerical and Statistical Methods for Civil Engineers
Prerequisite/s	Set theory, Differentiation & Integration
Teaching Scheme: Lecture/Tutorial/Self study	02/01/05
Credits	04
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
OUCWPC301_1	Evaluate conditional and probabilities using foundational axioms, theorems, and Bayes' rule to resolve event uncertainties.	L3
OUCWPC301_2	Apply the properties and fitting techniques of binomial, Poisson, and normal distributions to solve theoretical and real-world probability problems.	L3
OUCWPC301_3	Develop predictive models using regression analysis and interpret relationships between engineering variables.	L4
OUCWPC301_4	Apply numerical integration and interpolation methods to estimate values.	L3
OUCWPC301_5	Solve ordinary differential equations using numerical methods.	L3
OUCWPC301_6	Determine roots of algebraic and transcendental equations using numerical techniques.	L3

Course Contents:		
Unit 1	Probability Theory: Introduction, Definition of probability, Addition theorem of probability, Multiplication theorem of probability, Bayes' theorem of inverse probability,	7Hrs.
Unit 2	Theoretical Probability Distributions: Binomial distribution, Poisson distribution, Normal distribution, Fitting of binomial distributions, Properties of binomial, Poisson, and normal distributions.	7Hrs.
Unit 3	Correlation: Introduction, Karl Pearson's correlation coefficient, Spearman's rank correlation Coefficient, Standard error, Probable errors. Linear Regression Analysis: Introduction, Linear and non-linear regression, Lines of regression, regression lines of y on x and x on y, Coefficients of regression.	7Hrs


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Unit 4	Numerical Integration : Trapezoidal and Simpson's $1/3^{\text{rd}}$ rule, Simpson's $3/8^{\text{th}}$ rule Interpolation: Finite differences, Newton's forward/backward interpolation and Lagrange's interpolation formula.	7Hrs
Unit 5	Numerical Differentiation : Euler's method, Euler's modified method and Runge-Kutta second order & fourth order methods for solving engineering problems.	7Hrs
Unit 6	Numerical Methods-I Algebraic and Transcendental Equations: Introduction, The Bisection Method, The Method of False Position, Newton-Raphson Method	7Hrs

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Higher Engineering Mathematics	B. S. Grewal	Khanna Publishers	44 th Edition	
2	Advanced Engineering Mathematics	H. K. Das	S. Chand and Company	19 th Edition	Reprint 2011
3	A textbook of Engineering Mathematics	N. P. Bali & Dr. Manish Goyal	Laxmi Publication Pvt Ltd	8 th Edition	2011

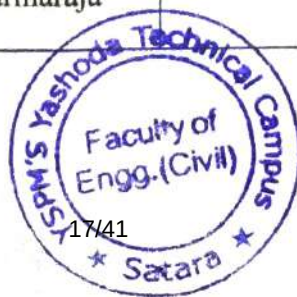
Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Fundamentals of Statistics	S. C. Gupta	Himalaya Publishing House	7 th Revised & Enlarged Edition	2016
2	Probability and Random Processes	G. V. Kumbhojkar	C. Jamnadas and Co.	14 th Edition	2010
3	Introductory Methods of Numerical Methods	S. S. Sastri	Prentice Hall of India, New Delhi	5 th Edition	2012
4	Numerical Methods	E. Balagurusamy	Tata McGraw Hill Publications	2 nd Edition	2020

E- Learning Resources:

Sr. No.	Title	Course Instructor	Platform	Web link
1	Introduction to Probability Theory and Stochastic	Prof. S Dharmaraja	NPTEL	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma107

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2	Numerical methods	Prof. Ameeya Kumar Nayak, Prof. Sanjeev Kumar	NPTEL	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ma84
3	Numerical Methods for Engineers	Prof. Niket Kaisare	NPTEL	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ge77

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Course Structure:

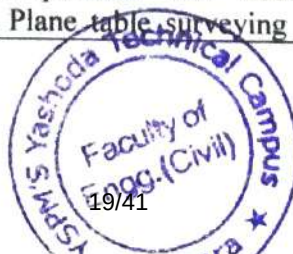
Class	S.Y. Sem. – III
Course Code and Course Title	0UCWPC302, Surveying and Geomatics
Prerequisite/s	***
Teaching Scheme: Lecture/Practical/Self Learning	03/02/04
Credits	03
Evaluation Scheme: ISE/MSE/ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWPC302_1	Apply the principles of surveying to perform linear and angular measurements using chain, tape, and compass, and solve basic surveying problems related to bearings and traversing.	L3
0UCWPC302_2	Compute areas and volumes using planimeters and numerical methods, and perform plane table surveying using appropriate field techniques.	L3
0UCWPC302_3	Determine elevations, contours, areas, and earthwork volumes using levelling techniques and appropriate computational methods for engineering applications.	L3
0UCWPC302_4	Analyze theodolite and traverse survey data to measure angles, compute traverse adjustments, and carry out setting-out operations.	L4
0UCWPC302_5	Apply advanced surveying technologies such as Total Station, GPS/GNSS, Remote Sensing, Drone Surveying, and GIS for geospatial data acquisition.	L3
0UCWPC302_6	Apply engineering project surveying techniques for route alignment, setting out, mine surveying, and tunnel surveying.	L3

Course Contents:

Unit 1	Introduction to surveying Introduction: objectives, principles, classification, linear and angular methods, survey stations, survey lines, and ranging. Linear distances - Approximate methods, Direct Methods- Chains-Tapes, ranging, Tape corrections, offsetting. Compass: Meridian, Bearings, Prismatic Compass and Surveyor Compass, Local Attraction, Traversing problems, Magnetic Declination.	07 Hrs.
Unit 2	Planimeter and Plane Table Survey Planimeter: Principles, Types of planimeters: Mechanical and Digital Planimeters. Theory of planimeter operation and the concept of the zero circle. Measurement of irregular areas using digital planimeters. Areas and Volumes: computation of area and volume by the Trapezoidal and Prismoidal rules. Plane Table Survey: Components and accessories, Advantages, limitations, and applications, Plane table surveying techniques: Radiation	07 Hrs.

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	and Intersection methods.	
Unit 3	Levelling, Contouring and Earthwork Computations Levelling: principles of levelling, Auto level, booking and reducing levels, methods- simple, differential, reciprocal, profile levelling and cross sectioning, errors in levelling. Contouring: characteristics and uses.	08 Hrs.
Unit 4	Theodolite and Traverse Surveying: Theodolite: Components, Technical terms, Axis of Theodolite, Temporary and Permanent adjustments of a theodolite, Measurement of horizontal and vertical angles. Traverse: Latitude and Departure, Closing error, Gales' traverse table, Bowditch's Rule and Transit Rule. Omitted measurements, precautions in using theodolite, errors in theodolite survey, Use of theodolite for various works such as prolongation of a straight line, setting out an angle	08 Hrs.
Unit 5	Advanced surveying techniques: Total Station: concept of EDM, principles and working, advantages and applications. Global Positioning System: Basic components and working principle of GPS/GNSS. GPS surveying methods: Static, Rapid Static, and overview of DGPS. Applications of GPS in civil engineering. Remote Sensing: definition, electromagnetic spectrum, spectral reflectance, classification of sensors- active and passive, resolution spatial, spectral radiometric and temporal resolution, Applications of remote sensing in surveying and mapping. Drone surveying: photogrammetric drone and LiDAR drone. Geographical Information System: components of GIS, GIS operations, map projections – methods.	06 Hrs.
Unit 6	Engineering Project and Specialized Surveys Stages of engineering surveys: Reconnaissance, Preliminary, Location, and Detailed Surveys. Layout and setting out techniques, Route alignment surveys for highways, railways, canals, pipelines, and waterways. Mine surveying: principles, objectives, and specialized surveying instruments. Tunnel surveying: surface and underground survey correlation, shaft transfer methods, alignment transfer and accuracy considerations.	06 Hrs.

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Surveying (Vol. I & II)	B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain	Laxmi Publications	17th	2023
2	Surveying and Levelling (Vol. I & II)	T. P. Kanetkar & S. V. Kulkarni	Pune Vidyarthi Griha Prakashan	25th	2021


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3	Surveying	S. K. Duggal	McGraw Hill Education	5th	2020
4	Fundamentals of Geomatics	Gopi Sathyanarayana	Pearson Education India	2nd	2018

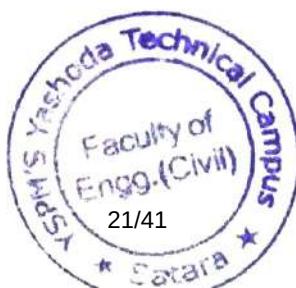
Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Elementary Surveying: An Introduction to Geomatics	Charles D. Ghilani & Paul R. Wolf	Pearson	16th	2022
2	Surveying and Geomatics	R. Agor	Khanna Publishers	3rd	2021
3	Remote Sensing and Image Interpretation	Thomas M. Lillesand, Ralph W. Kiefer & Jonathan W. Chipman	Wiley	8th	2019
4	Geographic Information Systems and Science	Paul A. Longley, Michael F. Goodchild, David J. Maguire & David W. Rhind	Wiley	5th	2021

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Surveying	Prof. J.K. Ghosh IIT Roorkee	NPTEL	https://nptel.ac.in/courses/105107122
2	Higher Surveying	Prof. Ajay Dashora IIT Guwahati	NPTEL	https://nptel.ac.in/courses/105103176
3	Drone Surveying	Prof. Pradeep Kumar Garg, Prof. Prakhar Misra IIT Roorkee	NPTEL	https://nptel.ac.in/courses/105107833
4	Remote Sensing and GIS Applications	Faculty, Indian Institute of Remote Sensing (IIRS)	ISRO-IIRS e-Learning	https://elearning.iirs.gov.in/
5	QGIS Training Manual	QGIS Development Team	QGIS Documentation	https://docs.qgis.org/latest/en/docs/training_manual/


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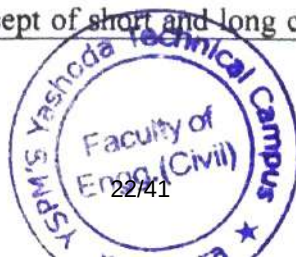
Course Structure:

Class	S.Y. Sem. – III
Course Code and Course Title	0UCWPC303, Mechanics of Solid
Prerequisite/s	Engineering Mechanics
Teaching Scheme: Lecture/Practical/Self-Learning	03/02/04
Credits	03
Evaluation Scheme: ISE/ MSE/ESE	20/20/60

Course Outcomes (COs):		Bloom's Level
Upon successful completion of this course, the student will be able to:		
0UCWPC303_1	Determine the stress-strain for homogeneous and composite bars.	L3
0UCWPC303_2	Draw shear force, and bending moment diagrams for determinate beams.	L3
0UCWPC303_3	Determine stresses in beams due to shear and bending.	L3
0UCWPC303_4	Determine principal stresses and strains.	L3
0UCWPC303_5	Analyze columns by using Euler's and Rankine's formula.	L4
0UCWPC303_6	Analyze circular shafts under torsional loading.	L4

Course Contents:		
Unit 1	Simple stresses and strains: Stress and strain -linear, lateral, shear and volumetric, generalized Hooke's law. Elastic constants and their relationship for isotropic materials. Axial force diagram, stresses, strains and deformation in determinate and indeterminate homogeneous and composite bars under concentrated loads, self-weight and temperature changes.	06 Hrs.
Unit 2	Shear force, bending moment diagram Concept and definition of shear force and bending moment. Beams under various types of loading, shear force and loading diagram from given bending moment diagram.	06 Hrs.
Unit 3	Stresses in beams due to shear & bending Shear stress distribution diagram for standard sections, maximum and average shear stress. Theory of pure bending, flexure formula, bending stress distribution diagram, moment of resistance and section modulus	06 Hrs.
Unit 4	Combined stresses and strains, and Theories of failure Analytical and graphical representation of state of combined stress at a point, absolute maximum shearing stress, principal stresses and strains, application of Mohr's circle. Theories of Failure: maximum principal stress theory, maximum principal strain theory, maximum strain energy theory, maximum shear stress theory, maximum shear strain theory.	06 Hrs.
Unit 5	Columns & Struts Columns and Struts: Concept of short and long columns, formulae by Euler,	06 Hrs.

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	Euler's Crippling load for different end conditions, limitations of Euler's formula, equivalent length, Rankine's formula and its applications	
Unit 6	Torsion of shafts and Thin cylinders Torsion: Assumptions, derivation of torsion formulae, torsion of circular shafts, power transmission, stresses and deformation in determinate solid/hollow homogeneous shafts. Thin cylinders - circumferential and longitudinal stresses	06 Hrs.

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Strength of Material	Khurmi R.S.,	S. Chand and Co., New Delhi	26 th Edition	2018
2	Strength of Material	Ramamrutham S.,	Dhanpat Rai and Sons, Delhi	17 th Edition	2011
3	Elements of Strength of Materials	Timoshenko S.P. and Young D.H	East West Press	5 th Edition	2002
4	Strength of Material	Singer F.L. and Pytle	CBS Publishers & Distributors Pvt. Ltd.	4 th Edition	2011
5	Mechanics of Structures	Junnarkar S.B.	McGraw-Hill Education	31 st Edition	2014

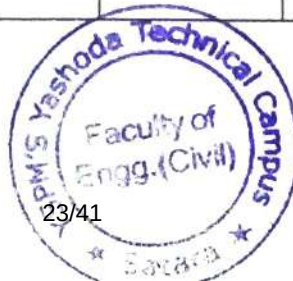
Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Mechanics of Materials	Punmia B. C	Laxmi Publications	5 th Edition	2018
2	Introduction to Mechanics of Solids	Popov E.P	Prentice-Hall	2nd Edition	2015
3	Strength of Materials	Subramanian R	Oxford University Press	2nd Edition	2016
4	Strength of Materials Schaum's outline series	Nash W.	McGraw-Hill Education	4 th Edition	2005

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1.	Strength Of Materials	Prof. K. Ramesh, Dr. Tarkes Dora Pallicity	NPTEL/S WAYAM	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_me137


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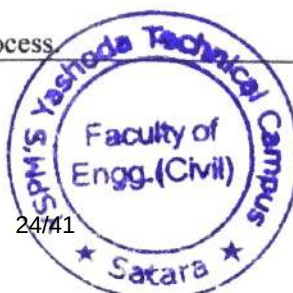
Course Structure:

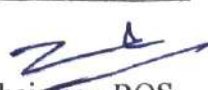
Class	B. Tech. Sem. –III
Course Code and Course Title	0UCWPC304 , Building construction and Services
Prerequisite/s	Basic Civil Engineering
Teaching Scheme: Lecture/Self Learning	03/04
Credits	03
Evaluation Scheme: ISE/MSE/ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWPC304_1	Choose material and type of masonry in various types of construction.	L3
0UCWPC304_2	Illustrate Components of RCC framed structures in Construction activities.	L3
0UCWPC304_3	Relate different types of means of communication in Buildings.	L3
0UCWPC304_4	Choose the type of building structures, roofs and floors for construction project.	L3
0UCWPC304_5	Relate different Building finishes and design for economical construction.	L3
0UCWPC304_6	Compare modern building services for smart and economical construction.	L3

Course Contents:		
Unit 1	Masonry Construction Stone masonry: Setting of stone, joints, Random rubble, un-coursed rubble, coursed rubble & ashlar types, General principles observed in stone Masonry. Brick masonry: General principles observed in Brick masonry, Bonds – English bond, Flemish Bond	07 Hrs.
Unit 2	Reinforced Cement Concrete Concrete & Reinforcement: Ingredients of concrete, mix design, Properties, tests, curing, Mixing, Reinforcement specification. Footing Types: Column Footing, Isolated and Combined Column Footing, Raft Foundation, Types of Pile foundation – bearing, friction, sheet, anchor, batter, fender, compaction.	07 Hrs.
Unit 3	Means of Communication Horizontal Communication: Doors –Components of Doors, Classification, Battened & ledged, Battened, ledged & braced, batten, ledged, braced & framed, framed & paneled, glazed, flush, revolving, sliding, collapsible, rolling. Windows: Component of windows, Types of Windows: fixed, pivoted, double hung, sliding, glazed, louvered, dormer, sky light, ventilators, bay window. Vertical Communication –Stair Case-Types, lifts-Introduction.	07 Hrs.
Unit 4	Building structures, Construction Process, Roofs, Floors Types of building structure: Load bearing structure, Framed structure and composite structure. Building Construction Stage wise process.	07 Hrs.


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	Roofs- a) Types - Pitched, Flat, lean-to roof, coupled roof, Collar roof, b) Roof covering – Thatch covering, Shingles, Manglore Tiles, Aesbestos cement sheets, galvanized corrugated iron sheet Floors- Types of Floors.	
Unit 5	Building Finishes and Design Plastering, Pointing and its various techniques, types of wall cladding and its properties (glazing and stone claddings), skirting, dado work, POP, gypsum plaster, fall ceilings, paints etc. Waterproofing treatment (Sunk slabs, walls, balcony and terrace), Anti-termite treatment.	07 Hrs.
Unit 6	Modern Building Services and Smart Buildings Building Automation- Building Management System (BMS), HVAC system, Smart meters. Sustainable Building Services- Solar water heating, Solar PV integration, Rainwater harvesting, Greywater recycling, Solid waste management, Energy-efficient lighting and appliances. Emerging Technologies- Smart buildings and IoT, AI applications in building management.	07 Hrs.

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Engineering Materials	Rangwala, S. C.	Charator publisher	First	2015
2	Construction Materials	Ghose, D. N.	Tata McGraw Hill, Delhi	First	2014
3	Building Construction	S. P. Arora and Bindra	Dhanpat Rai Publication, Delhi	First	2013
4	Building Construction	Sushil Kumar	Standard Publication	First	2010

Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Building construction	Dr. B.C. Punmia	Laxmi publications	10th	2016
2	A Text Book of Building Construction	S.P. Arora, S.P. Bindra	Dhanpat Rai Publications	Vol-III	2015
3	Construction Technology	R. Chudley	(ELBS)	(Volume 1 to 4)	2008-14
4	Engineering Materials Handbook of Building Construction.	R.K. Rajput	(S. Chand)	Handbook of Building Construction.	2021


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E- Learning Resources

Sr. No	Title	Course Instructor	Platform	Web link
1	Building Materials and Composites	Prof. Sumana Gupta	NPTEL/ Swayam	Preview: Building Materials and Composites SWAYAM

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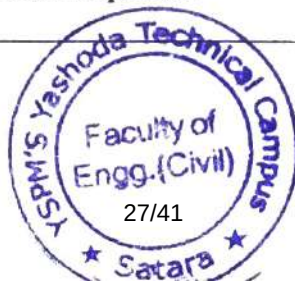
Course Structure:

Class	S.Y. Sem. –III
Course Code and Course Title	0UCWPC305, Engineering Fluid Mechanics
Prerequisite/s	-
Teaching Scheme: Lecture/Practical/Self Study	03/02/04
Credits	03
Evaluation Scheme: ISE / MSE / ESE	20/20/60

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWPC302_1	Explain the fundamental properties of fluids and types of fluids based on Newton's law of viscosity.	L2
0UCWPC302_2	Discuss the concepts of pressure measurement, hydrostatic forces, buoyancy, and stability of floating and submerged bodies.	L2
0UCWPC302_3	Apply the principles of fluid kinematics and dynamics to analyze fluid flow behavior using continuity, energy, momentum, and Navier–Stokes equations in practical engineering applications	L3
0UCWPC302_4	Analyze laminar and turbulent flow characteristics, apply boundary layer theory	L4
0UCWPC302_5	Apply dimensional analysis for solving problems of fluid flow.	L3
0UCWPC302_6	Analyze head loss and energy loss in pipes.	L4

Course Contents:		
Unit 1	Properties of Fluids Properties of fluids: basic definitions - mass density, specific weight, specific volume, specific gravity; viscosity- dynamic and kinematic, classification of fluids based on newton's law of viscosity surface tension, capillarity, vapour pressure, compressibility and elasticity.	6Hrs.
Unit 2	Fluid statics: pressure and its measurement, fluid pressure at a point, pascal's law, pressure measuring devices. Total pressure, intensity of pressure, center of pressure. Hydrostatic pressure on plane and curved surfaces, Buoyancy- Centre of buoyancy, stability of submerged and floating bodies, metacentre, metacentric height and its determination	7Hrs
Unit 3	Kinematics & Dynamics of Fluid Flow Fluid Kinematics -Equation of continuity for 3-D flow in Cartesian coordinates, velocity potential, stream function, flow net and it's use. Fluid Dynamics – Equation of motion, Euler's equation, Bernoulli's equation and practical applications of Bernoulli's equation: Venturi meter, Orifice meter and Pitot tube, Momentum Equation, Free and forced vortex flow, Concept of Navier-Stokes equation.	08 Hrs.

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Unit 4	Laminar Flow and Turbulent flow Fully developed laminar flow between infinite parallel plates, both plates stationary, upper plate moving with constant speed, fully developed laminar flow in pipe. Turbulent flow: Shear stress distribution and turbulent velocity profiles in fully developed pipe flow, velocity distribution and shear stresses in turbulent flow, Prandtl mixing length theory, Nikuradse's experiment, Introduction to Boundary Layer Theory	08 Hrs.
Unit 5	Dimensional Analysis and Similitude Nature of dimensional analysis, Rayleigh's Method, Buckingham pi theorem, dimensionless groups and their physical significance, flow similarity and model studies, Scale Effects, Distorted and Undistorted Models	06 Hrs
Unit 6	Flow through Pipes Minor losses, Head loss due to friction – Darcy-Weisbach equation, H.G.L. and T.E.L., Loss of energy in pipes, Pipe discharging for a reservoir, Pipe connecting two reservoirs in series and parallel, Siphon, Water Hammer in pipes-rigid and elastic water column theory, Surge tanks-function and types, Introduction to Moody's chart, Nomograms and other pipe diagrams.	07 Hrs.

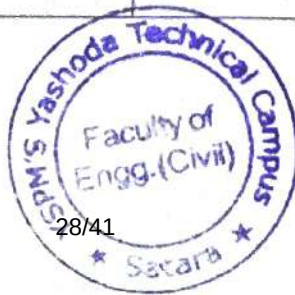
Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Fluid Mechanics and Hydraulic Machines	Dr. R. K. Bansal .	Laxmi Publications (P),Ltd. New Delhi	9th	2010
2	Fluid Mechanics and Hydraulic Machines	Dr. R. K. Rajput.	S. Chand & Co. Ltd., New Delhi	6th	2015
3	Fluid Mechanics and Hydraulic Machines	Sukumar Pati	McGraw Hill Education, New Delhi	2nd	2018
4	Engineering Fluid Mechanics	R. J. Garde	SCITECH Publications (India) Pvt. Ltd., Chennai	6th	2015

Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Hydraulics and Fluid Mechanics Including Hydraulic Machines	Dr. P. N. Modi & S. M. Seth	Standard Book House, Delhi	22	2017
2	Engineering Fluid Mechanics	Elger D. F.	Wiley	5 th	2015


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3	Fluid Mechanics and its Applications	Vijay Gupta, Santosh K Gupta	New Age international pvt. Ltd, New Delhi,	1st	2006
4	Flow In Open Channels	Subramanya K.	TMH	5th.	2019

E- Learning Resources

Sr. No	Title	Course Instructor	Platform	Web link
1	Fluid Mechanics	Prof. Subashisa Dutta	NPTEL/ Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_ce159


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Course Structure:

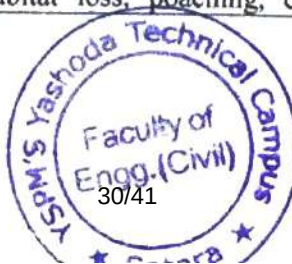
Class	S.Y. Sem. – III
Course Code and Course Title	0UCWVE306, Environmental Studies
Prerequisite/s	**
Teaching Scheme: Lecture / Self Learning	02/01
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWVE306_1	Demonstrate the concepts of natural resources, ecosystems, and biodiversity in addressing environmental issues across disciplines.	L3
0UCWVE306_2	Implement knowledge of causes, effects, and control measures of pollution to develop suitable mitigation strategies.	L3
0UCWVE306_3	Examine environmental ethics and their role in resolving societal and ecological challenges.	L4
0UCWVE306_4	Assess environmental laws and regulations for their effectiveness in societal and industrial contexts.	L4

Course Contents:

Unit 1	Fundamentals of Environmental Studies 1.1 Environmental Studies – Basics - Definition, scope, and importance, Multidisciplinary nature, 1.2 Ecosystem-Concept, structure, and functions, Producers, consumers, decomposers, Energy flow in ecosystem, Ecological succession 1.3 Ecological Interactions - Food chains, food webs, Ecological pyramids, 1.4 Types of Ecosystems (Overview) - Forest ecosystem - Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, rivers, oceans, estuaries)	07 Hrs.
Unit 2	Natural Resources and Energy Systems 2.1 Natural Resources - Forest resources: use, over-exploitation, deforestation, Water resources: use, overutilization, floods, drought, dams, Mineral resources: extraction, environmental impacts, Food resources: agriculture, modern practices, impacts 2.2 Energy Resources - Growing energy needs, Renewable vs non-renewable energy. 2.3 Alternate Energy Sources - Solar energy, Wind energy, Biomass energy, nuclear energy. 2.4 Land Resources - Land as a resource, Land degradation, Soil erosion and desertification, Landslides.	08 Hrs.
Unit 3	Biodiversity and Environmental Pollution 3.1 Biodiversity - Definition: genetic, species, ecosystem diversity, Biogeographical classification of India, Values of biodiversity-Consumptive, Productive, Social, ethical, aesthetic 3.2 Biodiversity Issues - India as a mega-diversity nation, Hotspots of biodiversity, Threats: habitat loss, poaching, conflicts, Endangered and	08 Hrs.

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	endemic species 3.3 Conservation of Biodiversity - In-situ conservation, Ex-situ conservation 3.4 Environmental Pollution - Definition, causes, effects, and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, nuclear hazards 3.5 Waste Management - Solid waste management, Urban and industrial waste control	
Unit 4	Social Issues, Environmental Ethics & Protection Laws 4.1 Social Issues and Environment - Sustainable development, Urban environmental problems, Water conservation, rainwater harvesting, Watershed management, Resettlement and rehabilitation issues 4.2 Global Environmental Issues - Climate change and global warming, Acid rain, Ozone layer depletion, nuclear accidents and holocaust 4.3 Environmental Ethics - Role of ethics in environmental protection 5 Case-based understanding 4.4 Environmental Legislation - Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act 4.5 Human Population and Environment - Population growth and its impacts, Human rights and environment	07 Hrs.

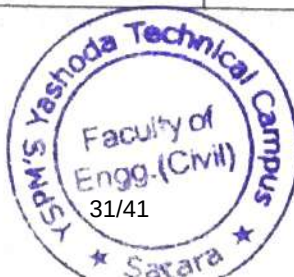
Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Environmental Studies	Erach Bharucha	Universities Press	2nd Edition	2013
2	Environmental Studies	Anubha Kaushik & C. P. Kaushik	New Age International	5th Edition	2018
3	Textbook of Environmental Studies	Deeshita Dave & P. Udaya Bhaskar	Cengage Learning	2nd Edition	2017
4	Environmental Science	Daniel B. Botkin & Edward A. Keller	Wiley India	9th Edition	2014

Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Principles of Environmental Science and Engineering	P. Venugopala Rao	Prentice Hall India	2nd Edition	2006
2	Environmental Science	G. Tyler Miller & Scott Spoolman	Cengage Learning	15th Edition	2014
3	Introduction to Environmental Engineering and Science	Gilbert M. Masters & Wendell P. Ela	Pearson	3rd Edition	2008
4	Environmental Pollution Control Engineering	C. S. Rao	New Age International	2nd Edition	2006


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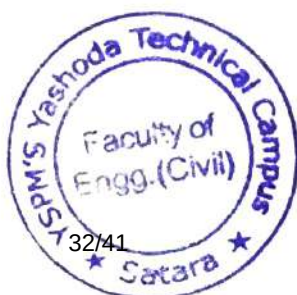


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E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Environmental Studies	Prof. T. R. Sreekrishnan	NPTEL/ Swayam	https://nptel.ac.in/courses/120108004
2	Environmental Engineering and Science	Prof. B. Sengupta	NPTEL/ Swayam	https://nptel.ac.in/courses/105105160
3	Ecology and Environment	Prof. A. K. Sharma	NPTEL/ Swayam	https://onlinecourses.swayam2.ac.in/ugc20_gell
4	Global Environmental Management	Technical University of Denmark (DTU)	Coursera	https://www.coursera.org/learn/global-environmental-management


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Course Structure:

Class	S.Y. Sem – ODD
Course Code and Course Title	0UCWHM307, Engineering Economics
Prerequisite/s	-
Teaching Scheme: Lecture/Self Study	02/01
Credits	02
Evaluation Scheme: ISE	50

Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWHM307_1	Analyze macroeconomic policies and economic problems using market dynamics and IS/LM models.	L4
0UCWHM307_2	Examine the impact of market failures, financial systems, and banking policies on inflation.	L4
0UCWHM307_3	Calculate business forecasts and resource allocations using budgets, cost metrics, and linear models.	L3
0UCWHM307_4	Deconstruct patterns of regional, gender, and social exclusion using growth and employment data.	L4

Course Contents:

Unit 1	Basic Principles and Methodology of Economics Demand/Supply – elasticity –Government Policies and Application. Theory of the Firm and Market Structure. Basic Macroeconomic Concepts (including GDP/GNP/NI/Disposable Income) and Identities for both closed and open economies. Aggregate demand and Supply (IS/LM). Price Indices (WPI/CPI), Interest rates, Direct and Indirect Taxes.	7 Hrs.
Unit 2	Public Sector Economics Welfare, Externalities, Labour Market. Components of Monetary and Financial System, Central Bank –Monetary Aggregates; Commercial Banks & their functions; Capital and Debt Markets. Monetary and Fiscal Policy Tools & their impact on the economy – Inflation and Phillips Curve.	7 Hrs.
Unit 3	Elements of Business/Managerial Economics and forms of organizations Cost & Cost Control –Techniques, Types of Costs, Budgets, Break even Analysis, Capital Budgeting, Application of Linear Programming. Investment Analysis – NPV, ROI, IRR, Payback Period, Depreciation, Time value of money. Business Forecasting – Elementary techniques. Statements – Cash flow, Financial. Case Study Method.(Simple Numerical Expected)	7 Hrs.
Unit 4	Indian economy Brief overview of post-independence period plans. Post reform Growth, Structure of productive activity. Issues of Inclusion Sectors, States/Regions, Groups of people (M/F), Urbanization. Employment–Informal, Organized, Unorganized, Public, Private. Challenges and Policy Debates in Monetary, Fiscal, Social, External	7 Hrs.

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	sectors.	
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Text Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Fundamentals of Engineering Economics	Pravin Kumar	Wiley Precise Text book Series	First	2015
2	Principles of Economics	Mankiw Gregory N	Thompson Asia	Second	2002
3	Managerial Economics	V. Mote, S. Paul, G. Gupta	Tata McGraw Hill	First	2004
4	Engineering Economics	James L. Riggs	McGraw-Hill Education	Fourth	2004

Reference Books:

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Indian Economy	Misra, S.K. and Puri	Himalaya	First	2009
2	Textbook of Business Economics	Pareek Saroj	Sunrise Publishers	First	2003
3	Cost Accounting Principles and Practice	S. P. Jain and K. L. Narang	Kalyani Publishers	Twenty Sixth	2019
4	Macroeconomics	N. Gregory Mankiw	Worth Publishers	Tenth	2019

E- Learning Resources:

Sr. No.	Title	Course Instructor	Platform	Web Link
1	Engineering Economic Analysis	Prof. Pradeep Kumar Jha IIT Roorkee	NPTEL/Swayam	https://onlinecourses.nptel.ac.in/e-learning/preview/noc25_me98

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Course Structure:

Class	S.Y. Sem. – III
Lab Code and Lab Title	0UCWPC308, Surveying and Geomatics Lab
Prerequisite/s	***
Teaching Scheme: Practical/Self Learning	02/01
Credits	1
Evaluation Scheme: ISE / ESE	25/25

Course Outcomes (COs)		Bloom's Level
Upon successful completion of this Lab, the student will be able to:		
0UCWPC308_1	Apply chain surveying, compass surveying and plane table surveying techniques to conduct field measurements and prepare detailed site plans.	L3
0UCWPC308_2	Apply levelling and planimeter techniques to determine reduced levels, elevation differences and areas of given survey plots.	L3
0UCWPC308_3	Apply theodolite and total station surveying techniques for accurate measurement of horizontal and vertical angles, distances and coordinates.	L3
0UCWPC308_4	Analyze survey observations obtained from theodolite, total station and compass surveys to identify errors and perform appropriate corrections and traverse adjustments.	L4
0UCWPC308_5	Apply GIS, Remote Sensing, DGPS surveying techniques to generate digital maps, road profiles, contour maps and spatial information.	L3
0UCWPC308_6	Analyze geospatial and photogrammetric survey data to interpret terrain characteristics, ground coordinates, contours and site conditions for civil engineering applications.	L4

List of Experiments:

Expt. No.	Title of Experiment
1	To conduct a detailed site survey and prepare a site plan using chain surveying.
2	Measurement of Bearings using Prismatic Compass with Local Attraction Correction.
3	Perform Differential Levelling Using an Auto Level and finding Reduce Levels by the Height of Instrument (HI) and Rise & Fall Methods.
4	Measurement of Irregular Area using Digital and Mechanical Planimeter.
5	Determine the Position of Survey Stations Using Radiation and Intersection Methods of Plane Table Survey.
6	Apply Theodolite Surveying Techniques for Measurement of Horizontal Angles.
7	Apply Theodolite Surveying Techniques for Measurement of Vertical Angles.
8	Conduct Survey Using a Total Station for Accurate Distance and Angular Measurement
9	Road Profile Mapping and Analysis Using GIS and Remote Sensing Techniques.


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10	Determination of Ground Coordinates and Mapping Using DGPS.
11	Aerial Photogrammetric Survey Using Drone for Site Mapping.
12	Closed Traverse Survey using Theodolite and Adjustment by Bowditch's Rule.
13	Project 1: Preparation of Contour Map for a Given Block Using GIS and Remote Sensing

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Surveying (Vol. I & II)	B. C. Punmia, Ashok Kumar Jain & Arun Kumar Jain	Laxmi Publications	17th	2023
2	Surveying and Levelling (Vol. I & II)	T. P. Kanetkar & S. V. Kulkarni	Pune Vidyarthi Griha Prakashan	25th	2021
3	Surveying	S. K. Duggal	McGraw Hill Education	5th	2020
4	Fundamentals of Geomatics	Gopi Sathyanarayana	Pearson Education India	2nd	2018

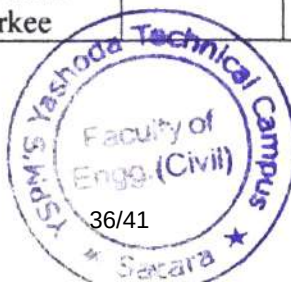
Reference Books

Sr. No.	Title	Author	Publisher	Edition
1	Elementary Surveying: An Introduction to Geomatics	Charles D. Ghilani & Paul R. Wolf	Pearson	16th
2	Surveying and Geomatics	R. Agor	Khanna Publishers	3rd
3	Remote Sensing and Image Interpretation	Thomas M. Lillesand, Ralph W. Kiefer & Jonathan W. Chipman	Wiley	8th
4	Geographic Information Systems and Science	Paul A. Longley, Michael F. Goodchild, David J. Maguire & David W. Rhind	Wiley	5th

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
1	Surveying	Prof. J.K. Ghosh IIT Roorkee	NPTEL	https://nptel.ac.in/courses/105107122
2	Higher Surveying	Prof. Ajay Dashora IIT Guwahati	NPTEL	https://nptel.ac.in/courses/105103176
3	Drone Surveying	Prof. Pradeep Kumar Garg, Prof. Prakhar Misra IIT Roorkee	NPTEL	https://nptel.ac.in/courses/105107833


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4	Remote Sensing and GIS Applications	Faculty, Indian Institute of Remote Sensing (IIRS)	ISRO-IIRS e-Learning	https://elearning.iirs.gov.in/
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Course Structure:

Class	S.Y. Sem. – III
Course Code and Course Title	0UCWPC309, Mechanics of Solid Lab
Prerequisite/s	Engineering Mechanics
Teaching Scheme: Practical/Self Study	02/01
Credits	01
Evaluation Scheme: ISE / ESE	25/25

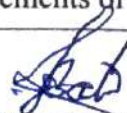
Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWPC309_1	Perform tension, compression, and shear tests on engineering materials.	L4
0UCWPC309_2	Determine torsion, flexure, and deflection tests and interpret the results.	L3
0UCWPC309_3	Determine principal stresses using graphical methods.	L3
0UCWPC309_4	Perform impact and hardness experiments on engineering materials.	L3

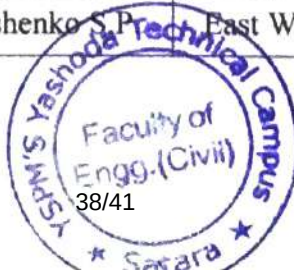
List of Experiments:

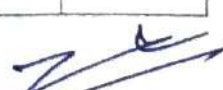
Expt. No.	Title of Experiment
1	Tension test on mild steel / cast iron /aluminum specimens.
2	Compression test on mild steel/ aluminum/ concrete and timber specimen.
3	Shear test on mild steel and aluminum (single and double shear tests).
4	Torsion test on mild steel / cast iron solid bars and pipes.
5	Flexure test on timber specimens.
6	Deflection test on mild steel / wooden beam specimens.
7	Graphical solution method for principal stress problems.
8	Impact test on mild steel, brass, Aluminum, and cast-iron specimens.
9	Hardness test on brass, Aluminum, and cast-iron specimens.
Note: Use of computer programs such as MS Excel is desirable for post-processing of results.	

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Strength of Material	Khurmi R.S.,	S. Chand and Co., New Delhi	26 th Edition	2018
2	Strength of Material	Ramamrutham S.,	Dhanpat Rai and Sons, Delhi	17 th Edition	2011
3	Elements of Strength	Timoshenko S.P.	East West Press	5 th	2002


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	of Materials	and Young D.H		Edition	
4	Strength of Material	Singer F.L. and Pytle	CBS Publishers & Distributors Pvt. Ltd.	4 th Edition	2011
5	Mechanics of Structures	Junnarkar S.B.	McGraw-Hill Education	31 st Edition	2014

Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Mechanics of Materials	Punmia B. C	Laxmi Publications	5 th Edition	2018
2	Introduction to Mechanics of Solids	Popov E. P	Prentice-Hall	2nd Edition	2015
3	Strength of Materials	Subramanian R	Oxford University Press	2nd Edition	2016
4	Strength of Materials Schaum's outline series	Nash W.	McGraw-Hill Education	4 th Edition	2005

E- Learning Resources

Sr. No.	Title	Course Instructor	Platform	Web link
2. 1	Strength Of Materials	Prof. K. Ramesh, Dr. Tarkes Dora Pallicity	NPTEL/ SWAYAM	https://onlinecourses.nptel.ac.in/e-learning/preview/noc26_me137

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Course Structure:

Class	S.Y. Sem. – III
Course Code and Course Title	0UCWPC310, Engineering Fluid Mechanics Lab
Prerequisite/s	-
Teaching Scheme: Practical/Self Study	02/01
Credits	01
Evaluation Scheme: ISE / ESE	25/25

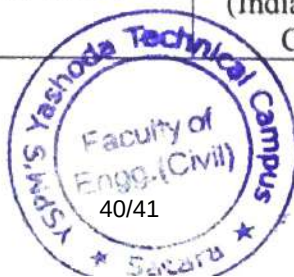
Course Outcomes (COs): Upon successful completion of this course, the student will be able to:		Bloom's Level
0UCWPC307_1	Compute the viscosity of fluid.	L3
0UCWPC307_2	Apply the concept of Bernoulli's theorem to fluid flow systems.	L3
0UCWPC307_3	Determine coefficient of discharge of various flow measuring devices.	L3
0UCWPC307_4	Calculate the head losses in pipes	L3

Sr. No.	List of Experiments (Any 8)
1	Measurement of discharge
2	Determination of viscosity of fluid.
3	Determination of metacentric height
4	Measurement of pressure Piezometer, manometers, Pressure gauges
5	Verification of Bernoulli's Theorem
6	Determination of coefficient of discharge of Venturimeter
7	Determination of coefficient of discharge of Orifice meter.
8	Estimation of the head loss due to friction incurred by a fluid along a pipeline (To find the friction factor for the given pipes of two different diameters)
9	To determine different losses in pipe fittings (Estimation of the minor losses)

Text Books

Sr. No	Title	Author	Publisher	Edition	Year of Edition
1	Fluid Mechanics	Streeter, V. H. / Willie, E. B.	TMH	9th	2016
2	Fluid Mechanics and Hydraulic Machines	Dr. R. K. Rajput.	S. Chand & Co. Ltd., New Delhi	6th	2015
3	Fluid Mechanics and Hydraulic Machines	Sukumar Pati	McGraw Hill Education, New Delhi	2nd	2018
4	Engineering Fluid Mechanics	R. J. Garde	SCITECH Publications (India) Pvt. Ltd., Chennai	6th	2015

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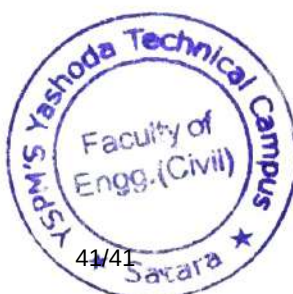
Reference Books

Sr. No.	Title	Author	Publisher	Edition	Year of Edition
1	Hydraulics and Fluid Mechanics Including Hydraulic Machines	Dr. P. N. Modi & S. M. Seth	Standard Book House, Delhi	22	2017
2	Engineering Fluid Mechanics	Elger D. F.	Wiley	5th	2015
3	Fluid Mechanics and its Applications	Vijay Gupta, Santosh K Gupta	New Age international pvt. Ltd, New Delhi,	1st	2006
4	Flow In Open Channels	Subramanya K.	TMH	5th	2019

E- Learning Resources

Sr. No	Title	Course Instructor	Platform	Web link
1	Fluid Mechanics	IIT Bombay	Virtual lab	https://fm-nitk.vlabs.ac.in/


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