



# RBU

**RAMDEOBABA UNIVERSITY, NAGPUR**

Formerly Shri Ramdeobaba College of Engineering & Management (RCOEM) Est. 1984

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**RAMDEOBABA UNIVERSITY  
NAGPUR-440013**

**School of Engineering Sciences**

**PROGRAMME SCHEME & SYLLABI**

**2025 –2026 I Year**

**B.Tech. (CIVIL ENGINEERING)**

**Shri RamdeobabaUniversity, Nagpur.**  
**Department of Civil Engineering**  
Teaching and Evaluation Scheme B.Tech (Civil Engineering) NEP-2020 based  
To be implemented from Session: 2025-26

<b>Semester – I</b>									
Course Code	Category	Name of Course	Lecture (Hours)	Practical (Hours)	Credits	CA	ESE/ Internal Evaluation	Total	ESE Duration
	BSC-T&P	Physics for Civil Engineering	3	2	4	100	50	150	3
	BSC-T	Calculus, Probability and Statistics	3	0	3	50	50	100	3
	ESC-T	Engineering Mechanics	3	0	3	50	50	100	3
	ESC-T&P	Application of python in Civil Engineering	2	2	3	100	50	150	2
	ESC-T	Building Materials & Components	1	0	1	50	-	50	-
	VSEC-P	Engineering Drawing and Drafting (AutoCAD)	0	4	2	50	-	50	-
	AEC-T&P	English for Professional Communication	2	2	3	100	50	150	2
	CC-P	Liberal/Performing Art	0	2	1	50	-	50	-
	VEC	Foundational Course in Universal Human Values	1	0	1	50	-	50	-
			<b>15</b>	<b>12</b>	<b>21</b>	<b>600</b>	<b>250</b>	<b>850</b>	<b>13</b>

\*List of Liberal/Performing Art courses are enclosed

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**SyllabusandSchemeforLiberal/Performingartsbasket**

Sr. no.	Course Code	Course Title	Lecture	Practical	Credits	Continuous Evaluation	End Sem Exam/ Internal Evaluation	Total	ESE Duration
1.		Fundamentals of Indian Classical Dance: Bharatnatayam	0	2	1				N/A
2.		Fundamentals of Indian Classical Dance: Kathak	0	2	1				N/A
3.		Introduction to Digital Photography	0	2	1				N/A
4.		Introduction to Basic Japanese Language	0	2	1				N/A
5.		Art of Theatre	0	2	1				N/A
6.		Introduction to French Language	0	2	1				N/A
7.		Art of Painting	0	2	1				N/A
8.		Art of Drawing	0	2	1				N/A
9.		Nature Camp	0	2	1				N/A
10.		Developing Self-awareness	0	2	1				N/A
11.		Art of Poetry	0	2	1				N/A
12.		Creative and Content Writing	0	2	1				N/A
13.		Science of life through Bhagwad Gita	0	2	1				N/A
14.		Adventure Sports	0	2	1				N/A
15.		Introduction to Defense Forces & Obstacle Training	0	2	1				N/A
16.		Self Defense & Indian Martial Arts	0	2	1				N/A
17.		Basic Nutritional Course	0	2	1				N/A
18.		Introduction to Remedies by Ayurveda	0	2	1				N/A
19.		Biodegradation of Kitchen Waste	0	2	1				N/A
20.		Herbal Home Remedies: A Course for Self-Care	0	2	1				N/A
21.		Day-to-Day Electrical Systems	0	2	1				N/A

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**Semester-II**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	Total	ESE Duration
	BSC-T&P	Engineering Chemistry for Civil Engineers	3	2	4	100	50	150	3
	BSC-T	Linear Algebra and Multivariate Calculus	3	0	3	50	50	100	3
	ESC-T&P	Basics of Geotechnical Engineering	3	2	4	100	50	150	3
	PCC-T&P	Solid Mechanics	3	2	4	100	50	150	3
	VSEC-T	Building Services	3	0	3	50	50	100	3
	IKS-T	Foundational literature for Indian civilization	2	0	2	50	50	100	3
	CC-P	Sport-Yoga-Recreation	0	2	1	50	-	50	-
			<b>17</b>	<b>08</b>	<b>21</b>	<b>500</b>	<b>300</b>	<b>800</b>	<b>18</b>

**Exit Option**

Option 1	Infrastructure/Real Estate/Industry Internship (1 Month)	0	0	8	Industry Internship completion certificate along with report
Option 2	Mini Project with report(1 Month)	0	0	8	Mini project report to be assessed by supervisor

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**Semester-III**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	PCC-T&P	Fluid Mechanics	3	2	4	100	50	150	3
	PCC-T&P	Concrete Technology	3	2	4	100	50	150	3
	PCC-T&P	Structural Analysis	3	2	4	100	50	150	3
	VEC-T	Technical Report Writing	1	0	1	50	-	50	-
	MDM-T	List attached	3	0	3	50	50	100	3
	OE-T	<b>Open Elective - I</b>	2	0	2	100	50	150	2
	MGMT-T	Finance Management for Civil Engg. projects	2	0	2	50	50	100	2
	FP-P	Field visit	0	4	2	50	-	50	-
			<b>17</b>	<b>10</b>	<b>22</b>	<b>550</b>	<b>300</b>	<b>850</b>	<b>16</b>

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**Semester-IV**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	PCC-T&P	Water Supply Engineering	3	2	4	100	50	150	3
	PCC-T	Reinforced Concrete Structures	3	0	3	100	50	150	3
	PCC-T&P	Basics of Surveying	3	2	4	100	50	150	3
	MDM-T	List attached	3	0	3	100	50	150	3
	OE-T	<b>Open Elective - II</b>	3	0	3	100	50	150	3
	MGMT-T	Construction Engineering & Management	3	0	3	100	50	150	3
	VSEC	Computational Tools for Civil Engineering	0	2	1	50	-	50	-
			<b>18</b>	<b>6</b>	<b>21</b>	<b>650</b>	<b>300</b>	<b>950</b>	<b>18</b>

Option 1	Infrastructure/Real Estate/Industry Internship (1 Month)	0	0	8	Industry Internship completion certificate along with report
Option 2	Mini Project with report (1 Month)	0	0	8	Mini project report to be assessed by supervisor

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**Semester-V**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	PCC-T	Transportation Engineering	3	2	4	100	50	150	3
	PCC-T&P	Sanitary Engineering	3	2	4	100	50	150	3
	PCC-T	Estimating & Costing	3	0	3	50	50	100	3
	PCC-T	Advanced Concrete Structures	3	0	3	50	50	100	3
	PEC-T	Program Elective-T	4	0	4	50	50	100	3
	MDM-T	List attached	3	0	3	50	50	100	3
	OE-T	<b>Open Elective - III</b>	2	0	2	50	50	100	3
			<b>21</b>	<b>4</b>	<b>23</b>	<b>450</b>	<b>350</b>	<b>800</b>	<b>21</b>

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**Semester-VI**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	PCC-T&P	Design of Steel Structures	3	2	4	100	50	150	3
	PCC-T	Foundation Engineering	3	0	3	50	50	100	3
	PCC-T&P	Flow through pipes & channels	2	2	3	100	50	150	3
	PEC-T&P	Program Elective - II	3	2	4	100	50	150	3
	PEC-T	Program Elective - III	3	0	3	50	50	100	3
	MDM-T	List Attached	3	0	3	50	50	100	3
	VSEC-P	Quality control in construction processes	0	2	1	50	-	50	-
	CCA-P	Simulation in Civil Engineering	0	2	1	50	-	50	-
			<b>17</b>	<b>10</b>	<b>22</b>	<b>550</b>	<b>300</b>	<b>850</b>	<b>18</b>

**Exit Option**

Option 1	Infrastructure/Real Estate/Industry Internship (1 Month)	0	0	8	Industry Internship completion certificate along with report
Option 2	Minor Project with report (1 Month)	0	0	8	Mini project report to be assessed by supervisor



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**Semester-VII/VIII**

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	PEC-T&P	Program Elective - IV	3	2	4	100	50	150	3
	PEC-T	Program Elective - V	4	0	4	50	50	100	3
	PEC-T	Program Elective - VI	3	0	3	50	50	100	3
	PCC-T	Hydrology and Water Resources Engineering	3	0	3	50	50	100	3
	Project-P	Minor Project	0	8	4	100	100	200	
	CCA	Participative Learning	1	0	1				
	CCA	Property Documentation for Civil Engineers	1	0	1	50	-	50	
			<b>15</b>	<b>10</b>	<b>20</b>	<b>400</b>	<b>300</b>	<b>700</b>	<b>12</b>

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**Semester-VIII/VII**

Course Code	Category	Name of Course	Lecture		Practical	Credits	Theory Course				Practical Course	
							CA	ESE	TOTAL	ESE Duration	CA	ESE
Option 1 - Project												
	VEC/ Project-P	Major Project	0		12	6			200		100	100
	PCC-T	Contracts Account and Work Management	3		0	3	50	50	100			
	PCC-T	Irrigation Engineering	3		0	3	50	50	100			
			6		12	12						
Option 2 – Industry Internship												
	II-P	Industry Internship	0		24	12					100	100
Option 3 - Research Internship												
	RI-P	Research Internship	0		18	9					100	100
	PCC	Research Methodology	3		0	3	50	50				
			3		18	12						
Option 4 - TBI Internship												
	TBI	TBI Internship	0		24	12					100	100

**Breakup of Semester wise Credits\***

<b>Semester</b>	<b>Lecture</b>	<b>Practical</b>	<b>Credits</b>
1	15	12	21
2	17	08	21
3	17	10	22
4	18	6	21
5	21	4	23
6	17	10	22
7	15	10	20
8	6	12	12
<b>Total</b>	<b>126</b>	<b>72</b>	<b>162</b>

Program Elective courses basket

Semester		Construction Management	Environmental Engineering	Structural Engineering	Geotechnical Engineering	Transportation Engineering	General	Water Resources
V	(PE-I) (T)	Advanced Concrete Technology	Environmental Impact Assessment	Advanced Structural Analysis	Geotechnical Explorations	Railway Engineering	Engineering Geology	Urban Drainage and Sewage System
VI	(PE-II) (T&P)	Advanced Construction Techniques	Climate Change & Mitigation	Retrofitting & Rehabilitation of Civil Infrastructure	Ground Improvement	Traffic Engineering and Management	Computer Aided Design and Drafting (CADD)	Introduction to Piping and Plumbing Engineering
	(PE-III) (T)	Urban Infrastructure	Solid Waste Management	Prestressed Concrete Structures	Advanced Geotechnical Engineering	Pavement Design	Infrastructure Planning and Management	Water Transmission & Distribution System
VII	(PE-IV) (T&P)	Advance construction Materials	Industrial Waste Water Treatment	Earthquake Resistant Design of RCC Structures	Reinforced Earth	Urban Transportation Planning	BIM	Integrated Water Resources Management
	(PE-V) (T)	Contracts Management	Air Pollution & Control	Bridge Engineering	Special Geotechnical Constructions	Airport Planning and Design	Numerical Method for Civil Engineers	Open Channel Hydraulics
	(PE-VI) (T)	Digital Technologies for Civil Engineers	Environmental System Modeling	Advanced Steel Structures	Earth and Rockfill Dams	Highway Construction And Management	Remote sensing and GIS	Watershed Conservation and Management

Sr. No	Semester	Open Electives
1	III	1) The Construction Industry: The Way Forward 8 2) Comfort in Buildings 3) Formwork Systems
2	IV	1) Introduction to Programming with MATLAB 2) Linear Regression and Modeling
3	V	1) Sustainable Construction in a Circular Economy 2) Precast & Advanced Pile Foundation 3) Transportation, Sustainable Buildings, Green Construction 4) Urban Nature: Connecting Cities, Sustainability and Innovation
Open Electives Basket		Smart Cities Ecology and Environment Green Technology Engineering Optimization Engineering Economics and Valuation Remote Sensing and GIS application Fire Fighting Services Metro Engineering

### **Participative Learning 1 Credit (12-14 Hours minimum)**

Short Course, Workshop, Hands-on-training, Training Program, MOOCCourses of 1 Credit (contents are beyond regular curriculum), Participation in competitions, Laboratory based Experimental Learning, Modelling of prototype, Filing/Grant of Design Patent/Copyright, any other work relevant to program certified by concerned faculty.

### **MDM (Multi Disciplinary Minor) courses**

1) **Understanding Civil Infrastructure:** This course focuses on explaining the fundamental elements of infrastructure such as roads, bridges, buildings, dams, and utilities, and their roles in society.

2) **Construction materials and technology:** Understanding construction materials and technology for civil engineers to design, construct, and maintain infrastructure that meets quality, safety, and sustainability requirements.

3) **Green Building and Vastu application in Civil Engineering:** Vastu principles into the design, construction, and operation of buildings and infrastructure projects and green building principles entails using environmentally friendly materials, optimizing energy efficiency, implementing renewable energy systems, and managing water resources efficiently.

4) **Construction Engineering & Processes :** Construction Engineering & Processes involves efficient project planning, sanctioning execution, and management to deliver structures that meet quality standards within budget and time constraints.

**NPTEL courses provision for Fast Learners  
(any 5 courses to be completed, to earn 15 credits)**

<b>Discipline</b>	<b>Course Name</b>	<b>SME Name</b>	<b>Institute</b>	<b>Co-ordinating Institute</b>
Civil Engineering	Air pollution and Control	Prof. Bhola Ram Gurjar	IITR	IITR
Civil Engineering	Engineering Hydrology	Prof. Sreeja Pekkatt	IITG	IITG
Civil Engineering	Bridge Engineering	By Prof. Piyali Sengupta	IIT (ISM) Dhanbad	(ISM) Dhanbad
Civil Engineering	Geotechnical Engineering II Foundation Engineering	Prof. Dilip Kumar Baidya	IITKGP	IITKGP
Civil Engineering	Urban Transportation Systems Planning	Prof. Bhargab Maitra	IITKGP	IITKGP
Civil Engineering	Analysis and Design of Bituminous Pavements	M. R. Nivitha (MRN) Neethu Roy (NR) A. Padmarekha (APR) J. Murali Krishnan (JMK)	IITM	IITM
Civil Engineering	Energy Efficiency, Acoustics and Daylighting in Building	Prof. B. Bhattacharjee	IITD	IITD
Earth Sciences	Remote Sensing and GIS for rural development	Prof. Pennan Chinna samy	IITB	IITB
Architecture, Civil and Design	Strategies for Sustainable Design	Prof. Shiva Ji	IIT Hyderabad	IITM
Multidisciplinary	Multi-Criteria Decision Making and Applications	Prof. Raghu Nandan Sengupta	IITK	IITK

**Shri RamdeobabaUniversity , Nagpur.**

Department of Civil Engineering  
B.Tech (Civil & Infrastructure Engineering) NEP-2020 based  
To be implemented from Session: 2024-25  
**Honors Teaching and Evaluation Scheme**

Course Code	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
	Construction Technology	3	0	3	50	50	100	3
	Fire fighting system	3	0	3	50	50	100	3
	Geotechnical Design	3	0	3	50	50	100	3
	Geotechnical Design Lab	0	2	1	25	25	50	-
	Foundation Design	3	0	3	50	50	100	3
	Foundation Design Lab	0	2	1	25	25	50	-
	Project	0	8	4	0	0	0	0
	<b>Total</b>	<b>12</b>	<b>10</b>	<b>18</b>	<b>250</b>	<b>250</b>	<b>500</b>	<b>12</b>

**Minor Teaching and Evaluation Scheme**

Course Code	Name of Course	Lecture	Practical	Credits				
					CA	ESE	TOTAL	ESE Duration
	Sustainable Engineering	3	0	3	50	50	100	3
	Disaster Management	3	0	3	50	50	100	3
	Engineering Ethics and Professional Practice	3	0	3	50	50	100	3
	Engineering Ethics and Professional Practice Lab	0	2	1	25	25	50	
	Basics of Civil Engineering	3	0	3	50	50	100	3
	Basics of Civil Engineering Lab	0	2	1	25	25	50	
	Project	0	8	4	0	0	0	0
	<b>Total</b>	<b>12</b>	<b>12</b>	<b>18</b>	<b>250</b>	<b>250</b>	<b>500</b>	



**"Titles of Certificates or Degrees upon Completion of Each Year in Bachelor of Technology (B.Tech) Civil Engineering"**

- 1) After 1<sup>st</sup> year exit :Certificate course in Civil Engineering
- 2) After 2<sup>nd</sup> year exit : Advanced Certificate course in Civil Engineering
- 3) After 3<sup>rd</sup> year exit : Diploma in Civil Engineering
- 4) After 4<sup>th</sup> year exit :B.Tech in Civil Engineering

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :**

**Course Name: Physics for Civil Engineering**

**L :3 Hrs., T: hr P :0 Hrs., Per Week 3**

**Credits: 3**

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**Course Objectives:**

1. To develop the ability to apply concepts of elementary physics to applications in civil engineering.
2. To introduce more advanced physics concepts, which form the basis of modern engineering.
3. To provide a sound foundation in mathematical formulation of concepts learnt and their cross-disciplinary applications.

**Course Outcomes:**

After successful completion of the course students will be able to

- CO 1. Analyse the effect of oscillations on civil structures.
- CO 2. Apply fundamental principles of acoustics to calculate reverberation time and sound absorption coefficients of construction materials.
- CO 3. Apply the principles of ultrasonics for non-destructive testing of concrete, steel materials.
- CO 4. Understand the use of laser and optical fibre sensors in civil engineering.
- CO 5. Understand the use nanomaterials to enhance the properties of materials used in civil engineering.

**Module 1: Oscillations**

Fundamentals of forces, Particle Dynamics in One Dimension: Velocity Dependent Force, Position Dependent Force, One-dimensional harmonic oscillator, damped oscillator, over, critical and under damping; Forced oscillator, undamped and damped cases; Examples, resonance and Q factor; Structural stability during earthquakes.

**Module 2: Architectural Acoustics**

Basics of acoustics of civil structures, Sound waves Properties, characteristics, Sound intensity level-Decibel, Reverberation time, Sound absorption, Reverberation theory, Determination of sound absorption coefficients, Materials used for sound absorption, Factors affecting acoustics of building and their remedies, acoustic design of hall.

**Module 3: Ultrasonics and Non-destructive testing**

Ultrasonic waves, Piezoelectric Effect, Production and detection of Ultrasonic Waves, Properties and types of Ultrasonic Waves, Cavitations, Determination of Velocity of Ultrasonic Waves, Non-Destructive testing methods, Ultrasonic Testing Methods

Use of Ultrasonic waves in Civil Engineering: Non-destructive testing of Concrete, Steel. Prediction of concrete strength, Inspection of concrete structure using ultrasonic scanner.

#### **Module 4 :Fibre Optics Sensors**

Introduction to Optical Fibre, Total Internal Reflection, Numerical Aperture, Modes of Propagation, Classification of Optical Fibres, Materials, V-Number, Losses in Optical Fibre, Fibre Optic Communication, Sensors: Stress, Strain and Temperature Sensors, Applications of Fibre Optic Sensors in Civil Engineering: Crack Monitoring, Cable and FRP Monitoring, Bridge Monitoring, Moisture Monitoring

#### **Module 5: Laser**

Fundamentals of lasers, Components of Laser, metastable state, population inversion, Pumping Methods; three level and four level laser, Modes of the Laser Beam, Types of laser: Ruby laser, He-Neon laser, Semiconductor laser, Laser Beam Characteristics, Applications of laser in Civil Engineering : 3D Laser Survey in Construction, Surveying and highways engineering,

#### **Module 6: Nanotechnology and Nanomaterials**

Introduction to nanotechnology, classification of nanomaterials, properties. Use of nanomaterials in Civil Engineering: construction materials concrete, steel, coating, glass, insulating materials. Fullerenes and nanoparticles; Outline of methods of preparation of nanomaterials; Elements of electron microscopy; Characterization techniques for nanomaterials, Outline of properties of nanomaterials - physical, thermal, optical, electrical, magnetic; Quantum size-effects; Carbon Nanotubes.

#### **Text Books:**

1. The Physics of vibrations and waves by H.J. Pain Sixth edition, John wiley and Sons, Ltd.
2. Engineering Physics by M.N. Avadhanulu and Kshirsagar S. Chand Publication

#### **Reference Books:**

1. Engineering Physics by Sanjay Jain and Girish Sahasrabudhe, Universities Press

#### **Assignments**

- Case Study : How to improve acoustics of given building space
- Case Study : Effect of oscillations on the stability of building
- Case Study : Use of sensors in real estate / Industry / Infrastructure
- Case Study : Use of Laser technology in Civil Engineering
- Case Study : Use of Nanomaterials in Civil Engineering Projects

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24HS05PR0101**

**Course Name: Physics for Civil Engineering Lab**

**L :0 Hrs., T: hr P : 2 Hrs., Per Week**

**Credits: 1**

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The Physics Laboratory course will consist of experiments illustrating the principles of physics relevant to the study of science and engineering. Students will show that they have learnt laboratory skills that will enable them to properly acquire and analyze the data in physics laboratory and draw valid conclusions.

**Course Outcomes**

At the end of the Course the students will be able to:

1. Develop the skills of error analysis and proper graph plotting.
2. Analyze the behavior and characteristics of Oscillatory motion.
3. Compute velocity of sound in different medium.
4. Understand the properties of laser and optical fibre.
5. Prepare laboratory reports on interpretation of experimental results.

**List of Experiments**

**A. General Physics Lab Experiments**

1. Measuring Scales and Error analysis using Vernier Caliper, Screw Gauge, Travelling Microscope, spherometer
2. Determination of volume, area and density of given materials
3. Plotting of linear and non-linear graphs using linear least square fitting.
4. Understanding characteristics of SHM, damped oscillations and forced oscillations
5. Determination of force Constant and effective mass of the helical spring system.
6. Determination of sound absorption coefficient of given materials.
7. Determination of adiabatic compressibility of liquid using Ultrasonic Interferometer
8. Determination of Velocity of sound in solids by Kund's Tube
9. Determination of wavelength of monochromatic light by laser diffraction method
10. Measuring the volume and areas of classrooms and labs using laser distance meter.
11. Moment of Inertia of a Flywheel.
12. Modulus of rigidity of wire using torsional pendulum
- 13.

**B. Open ended experiment on Virtual Lab**

**Suggested References:**

1. Physics Lab Manual written by the Teaching Faculty of Physics Department, RCOEM.
2. Engineering Physics by S. Jain and G. G. Sahasrabudhe, Universities press, 2013.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24HS03TH0101**

**Course Name: Calculus, Probability, and Statistics**

**L :3 Hrs., T:, P : 0 Hrs., Per Week**

**Credits: 3**

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**Course Objective:**

The objective of this course is to familiarize the prospective engineers with techniques in Ordinary differential equation, statistics, probability and differential calculus. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines.

**Course Outcomes**

On successful completion of the course, the students will able to:

1. Recognize first order ordinary differential equations that can be solved by each of the four methods – Linear DE, exact DE, reducible to linear DE and reducible to exact differential equations and use the appropriate method to solve them.
2. Solve higher order ordinary differential equations with constant and variable coefficients.
3. Find best fit curve by method of least square method and calculate correlation, regressions.
4. Internalize multivariable calculus and apply it find Jacobean, maxima and minima of function
5. Recognize and understand discrete, continuous probability distributions and apply Binomial distribution, Poisson distribution and Normal distribution to appropriate problems.

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**Syllabus**

**Module 1: *First order ordinary differential equations* (7 hours)**

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree, equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, Applications of First order Differential Equations.

**Module 2: *Ordinary differential equations of higher orders* (8 hours)**

Second order linear differential equations with constant and variable coefficients, method of variation of parameters, Cauchy-Euler equation. Applications of Higher order Differential Equations.

**Module 3: *Statistics*: (7 hours)**

Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves, correlation and regression – Rank correlation, Multiple regression and correlation and its application in Engineering.

**Module 4: Differential Calculus (10 hours)**

Taylor's and Maclaurin's series expansions, radius of curvature (Cartesian form), Limit and continuity of functions of several variables and their partial derivatives, Eulers Theorem, chain rule, total derivative, Jacobians, Maxima, minima and saddle points; Method of Lagrange multipliers.

**Module 5: Probability: (8 hours)**

Probability spaces, conditional probability, independence, Bay's Theorem, Discrete random variables, Binomial distribution, Poisson distribution, Normal distribution. Relation between binomial, Poisson and Normal distributions.

**Textbooks/References:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edition, Wiley India, 2009.
3. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
4. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.
5. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
6. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
7. Theory and Problems of probability and statistics : 2<sup>nd</sup> ed : J. R. Spiegel, Schaum series
8. A text book of Applied Mathematics Volume I & II, by P. N. Wartikar and J. N. Wartikar, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India).
9. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24ES01TH0101**

**Course Name: Engineering Mechanics**

**L : 3 Hrs., T:, P : 0 Hrs., Per Week**

**Credits: 3**

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**Course Outcomes:**

1. Apply the knowledge of force system and movement to determine resultants of various force system
2. Apply the knowledge of equilibrium of force system and friction to analyzed simple problems
3. Able to locate Centroid and evaluated Moment of Inertia for standard shape and composites areas.
4. Analyze simple determinate trusses for its forces in members.
5. Analyze the connected the systems of particles using knowledge of dynamics equilibrium

**UNIT-I**

**Basics Concepts and equilibrium of force systems.**

Introduction to Engineering Mechanics: Force Systems, Basic concepts, Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant Moment of Forces and its Applications; Couples and Resultant of Force System. **(6)**

Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems. Simple beams and support reactions. Diagram of Statically Determinate Beams. **(6)**

**Friction: (4)**

Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction.

**UNIT-II**

**Centroid and Moment of Inertia: (8)**

Centroid and Centre of Gravity, Centroid of simple figures from first principle, centroid of composite sections; Centre of Gravity and its implications; Area moment of inertia Definition,

Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections.

### **UNIT-III**

#### **Analysis of structures- Trusses (6)**

Analysis of simple trusses by method of joints & method of sections, Zero force members.

### **UNIT-IV**

#### **Kinetics of Particles (10)**

**Kinetics of particles** D'Alemberts principle and its application in connected system of particles, Impulse Momentum, Collision of bodies, Work Energy Method.

### **Textbooks**

1. *Engineering Mechanics: Statics and Dynamics- Hibbler. R.C., Prentice Hall*
2. *Fundamentals of Engineering Mechanics: A.K.Sharma, Sai Publication*

### **Reference books**

1. *Irving H. Shames (2006), Engineering Mechanics, 4th Edition, Prentice Hall*
2. *Vector Mechanics for Engineers: Statics and Dynamics – Johnston. R.E., Beer. F., Eisenberg. E. R,& Mazurek. D., McGraw Hill*
3. *R. C. Hibbler (2006), Engineering Mechanics: Principles of Statics and Dynamics, Pearson Press.*
4. *Shanes and Rao (2006), Engineering Mechanics, Pearson Education,*
5. *Hibler and Gupta (2010),Engineering Mechanics (Statics, Dynamics) by Pearson Education.*



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24ES01TH0102**

**Course Name: Application of python in Civil Engineering**

**L :2 Hrs., P : Hrs., Per Week      Credits: 2**

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**Course Outcomes:**

1. The student should be able to apply the basic python language constructs to solve problems
2. The student should be able to apply decision making concept in programming to get diversified output.
3. The student should be able to implement looping techniques within the program.
4. The student should be able to organize multi-dimensional data and efficiently manipulate it.
5. The student should be able to design and implement functions to promote code reusability.
6. The student should be able to understand the concept of graphical output.

**Course Content**

**Unit 1: Fundamentals**

Constants & Variables, input and output functions, mathematical operators, sample programs, importing inbuilt libraries.

**Unit 2: Decision Making**

Conditional operators, logical operators, if, if-else, if-not, if-elif-else, try-except, nested if else,

**Unit 3: Looping**

For loop, in-range, while loop.

**Unit 4: Arrays**

Types of arrays, Defining 1D and 2D arrays, numpy, using numpy for arrays operations such as arranges, linspace, mathematical operations, etc, file handling.

**Unit 5: Functions**

Defining functions, function calling.

## **Unit 6: Introduction to Graphics**

Introduction to matplotlib.pyplot, plotting text, values, lines, markers, axes, circles, polygons, arrows.

### **Text Books**

1. Python Programming Using Problem Solving Approach: Reema Thareja, Oxford University, Press; First edition.
2. Learning Python: Powerful object-oriented programming, Mark Lutz, O'REILLY publications 5th addition.
3. Introduction to Computing & Problem Solving with Python Jeeva Jose and P Sojan Lal Ascher.
4. Problem Solving with Algorithms and Data Structures using Python by Brad Miller and David Ranum, 2nd addition.

### **Reference Books**

1. Allen Downey, Jeffrey Elkner, Chris Meyers, Learning with Python, Dreamtech Press
2. David M. Baezly "Python Cookbook" O'Reilly Media; Third edition, 2013.

### **Google Books**

1. Python in a Nutshell, Alex Martelli, O'Reilly, 2<sup>nd</sup> Edition.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24ES01PR0103**

**Course Name: Computer Programming for Civil Engineers**

**L :0 Hrs., P :2 Hrs., Per Week      Credits: 1**

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**Course Outcomes:**

7. The student should be able to apply the basic python language constructs to solve problems
8. The student should be able to apply decision making concept in programming to get diversified output.
9. The student should be able to implement looping techniques within the program.
10. The student should be able to organize multi-dimensional data and efficiently manipulate it.
11. The student should be able to design and implement functions to promote code reusability.
12. The student should be able to understand the concept of graphical output.

**Course Content**

**Unit 1: Fundamentals**

Constants & Variables, input and output functions, mathematical operators, sample programs, importing inbuilt libraries.

**Unit 2: Decision Making**

Conditional operators, logical operators, if, if-else, if-not, if-elif-else, try-except, nested if else,

**Unit 3: Looping**

For loop, in-range, while loop.

**Unit 4: Arrays**

Types of arrays, Defining 1D and 2D arrays, numpy, using numpy for arrays operations such as arranges, linspace, mathematical operations, etc, file handling.

## **Unit 5: Functions**

Defining functions, function calling.

## **Unit 6: Introduction to Graphics**

Introduction to matplotlib.pyplot, plotting text, values, lines, markers, axes, circles, polygons, arrows.

### **Text Books**

5. Python Programming Using Problem Solving Approach: Reema Thareja, Oxford University, Press; First edition.
6. Learning Python: Powerful object-oriented programming, Mark Lutz, O'REILLY publications 5th addition.
7. Introduction to Computing & Problem Solving with Python Jeeva Jose and P Sojan Lal Ascher.
8. Problem Solving with Algorithms and Data Structures using Python by Brad Miller and David Ranum, 2nd addition.

### **Reference Books**

3. Allen Downey, Jeffrey Elkner, Chris Meyers, Learning with Python, Dreamtech Press
4. David M. Baezly "Python Cookbook" O'Reilly Media; Third edition, 2013.

### **Google Books**

2. Python in a Nutshell, Alex Martelli, O'Reilly, 2<sup>nd</sup> Edition.

**Ramdeobaba University, Nagpur**  
**Syllabus for Semester B.Tech I**  
**Department of Civil Engineering**

**Course Code :24ES01TH0104**

**Course Name: Building Materials & Components**

**L :1 Hrs., P : 0 Hrs., Per Week**

**Credits: 1**

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**Course Outcomes:**

After completion of course students will be able to:

1. Understand the various Civil Engineering Materials
2. Understand the role of different agencies in infrastructure development
3. Understand the functions of structural Element of building.
4. Understand the various masonry units and its suitability
5. Understand the various building Components and their utility.

**Unit I**

**Introduction to Infrastructure:** Classification of infrastructure. Types of building as per National Building Code (NBC). Role of Government, Municipality, Architect, Civil Engineers, Contractors etc. in infrastructure development.

Building elements: Foundations, Sub Structure and Super Structural element such as Plinth, Column, Beam, Lintel, Chajja

Stairs: functions and terminologies used suitability and types of stairs.

Roof: Types and functions of Roof

Flooring: Types and utility of Flooring

**Unit II**

**Construction materials**

Introduction to Construction materials like Tiles, Timber, plywood, facade, paints, and their Application.

**Unit III**

**Non-structural elements** Types of Walls. Masonry construction uses various building units such as Mud bricks, Stone, Red bricks, Fly bricks, AAC, and hollow concrete blocks with suitability and constraints.

#### **Unit IV**

##### **Openings in a Building**

Doors: Purpose, location, definition of technical terms, Size of doors, and various materials of construction and types.

Windows and ventilators: Necessity and types of windows.

#### **Text Books:**

1. Building Construction: B. C. Punmia, Laxmi publication Pvt. Ltd. New Delhi and distributor, 10<sup>th</sup> edition 1984 & later 2008
2. Building construction by Sushil Kumar, 16th Edition, Standard Publishers Distributors, 2006.
3. S. P. Bindra, S. P. Arora, Building Construction, Dhanpat Rai Publication, New delhi, Fourth Edition, 1988.
4. Building Construction Material by S.K. Duggal, 4th edition, New Age International, Reprint Nov. 2014.

#### **Reference Books:**

1. National Building Code of India
2. Building Construction and Materials by Singh Gurcharan, Standard Publisher and Distributor, Standard Publishers Distributors, 2003
3. Alternative building Materials and Technologies: K. S. Jagdish & B. V. Venkatarama Reddy, New age international Publishers, 2007.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24ES01PR0105**

**Course Name: Engineering Drawing and Drafting (AutoCAD)**

**L : Hrs., P : 4 Hrs., Per Week      Credits: 2**

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**COURSE OUTCOMES:**

After completion of course students will be able to:

1. Implement principles of planning of buildings
2. Design and draw various constructional drawing of the buildings.
3. Create, analyze, and produce 2D drawings.
4. Draw the plan, section and elevation of a building

**Principles of Planning:**

Concept of built environment and Principles of planning, Basic terminologies in submission drawing as per building bylaws.

Planning of residential building, Preparation of constructional details and drawings-plan, elevation, section, site plan, foundation plan, terrace plan.

**AutoCad**

Introduction of Auto CAD - Limits, units, Grid, Snap, Osnap. Mtext line Standard tool bars: Matchproperties, pan, zoom. Draw: Line, Pline, mline, Rectangle, polygard, Arc, Circle, Donut, Spline, Ellipse, Boundary, Hatch, Text, mtext. Modify/Edit: Erase, copy, Mirror, offset, array, move, rotate, scale, stretch, and lengthen, trim, Extend, Break, Chamfer, fillet, Explode. Dimensioning: linear, aligned, Baseline, Continue, Radius, diameter, Angular, Style. Layer: New layer, current layer, freeze, lock, colour, line type, line weight, delete.

**Drawings in AutoCAD**

1. Single line plan of building components
2. Development of double plan for residential building
3. Plans, elevations, and section al elevation of residential building
4. Preparation of submission and working Drawing
5. Typical detailing of beams, columns, and foundations.

**Text Books**

1. *M.G.Shah, Kale, Patki, Building Drawing with an integrated approach to built environment Tata McGraw Hill, 2002*
2. *Y.S.Sane, Building Drawing, Allied Book Stall & Engineering Book Publishing Co, 4th edition Green Home, BDS Publisher*
3. *Patil S. M., Building Services, 2008*

**Reference Books**

1. *National Building Code of India, 2005*
2. *AutoCAD Software Latest Version.*

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24HS02TH0101**

**Course Name: English for Professional Communication**

**L : 2 Hrs., P :0 Hrs., Per Week Credits: 2**

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**Course Objectives**

The main objective of this course is to enhance the employ ability skills of students as well as prepare them for effective work place communication.

**Course outcomes:**

**On successful completion of the course the students will be able to achieve the following:**

- CO1.Demonstrate effective use of word power in written as well as oral communication.
- CO2.Understand the techniques of listening and apply the technique so freadingcomprehension used in professional communication.
- CO3.Apply the principles of functional grammar in everyday as well as professional communication.
- CO4. Effectively implement the comprehensive principles of written communication by applying various writing styles.
- CO5.Createprecise and accurate written communication products.

**Unit-1: Vocabulary Building**

Importance of using appropriate vocabulary Techniques of vocabulary development commonly used power verbs, power adjectives and powered verbs. Synonyms, antonyms, phrases & idioms, one-word substitution sand standard abbreviations

**Unit-2: Listening and Reading Comprehension**

Listening Comprehension: active listening, reasons for poor listening, traits of a good listener, and barriers to effective listening Reading Comprehension: types and strategies.

**Unit-3: Functional Grammar and Usage**



Identifying Common Errors in use of: articles, prepositions, modifiers, modal auxiliaries, redundancies, and clichés Tense Subject-verb agreement, noun-pronoun agreement Voice

#### **Unit-4: Writing Skills**

Sentence Structures Sentence Types Paragraph Writing: Principles, Techniques, and Styles

#### **Unit-5: Writing Practices**

Art of Condensation: Précis, Summary, and Note Making

Correspondence writing techniques and etiquettes–academic writing Essay Writing

**Books**

1. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press. 2011.
2. *Practical English Usage*. Michael Swan. OUP. 1995.
3. *Remedial English Grammar*. F.T. Wood. Macmillan. 2007
4. *On Writing Well*. William Zinsser. Harper Resource Book. 2001
5. *Study Writing*. Liz Hamp-Lyons and Ben Heasley. Cambridge University Press. 2006.
6. *Exercises in Spoken English*. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code : 24HS02PR0101**

**Course Name: English for Professional Communication Lab**

**L : 0 Hrs., P :2 Hrs., Per Week Credits: 1**

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**CourseObjective**

To enhance competency of communication in English among learners

**CourseOutcomes**

**On completion of English Lab course, students will be able to achieve the following:**

**CO1:** Apply effective listening and speaking skills in professional and everyday conversations.

**CO2:** Demonstrate the techniques of effective Presentation Skills

**CO3:** Evaluate and apply the effective strategies for Group Discussions

**CO4:** Analyse and apply the effective strategies for Personal Interviews

**CO5:** Implement essential language skills-listening, speaking, reading, and writing

**Syllabus**

**List of practicals**

**Computer Assisted + Activity Based Language Learning**

Practical 1: Everyday Situations: Conversations and Dialogues–Speaking Skills

Practical 2: Pronunciation, Intonation, Stress, and Rhythm

Practical 3: Everyday Situations: Conversations and Dialogues–Listening Skills

**Activity Based Language Learning**

Practical 4: Presentation Skills: Orientation & Mock Session

Practical 5: Presentation Skills: Practice

Practical 6: Group Discussions: Orientation & Mock Session

Practical 7: Group Discussions: Practice

Practical 8: Personal Interviews: Orientation & Mock Session

Practical 9: Personal Interviews: Practice

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS02PR0105-01**

**1 Course Name: Fundamentals of Indian classical dance: Bharatnatayam**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

The course aims to introduce the students to Bharatnatyam, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

**Course Outcomes**

**On completion of the course, students will be able to achieve the following:**

CO1: Understand the importance of dance and Bharatnatayam as an Indian dance form

CO2: Develop skill to perform the dance form at its basic level.

CO3: Evaluate their strengths and interest to take bridge course to give

Pratham (1<sup>st</sup> level) formal exam of Bharatnatayam).

**Syllabus**

Practical-1: Orientation in Bharatnatayam

Practical-

2: Tattu Adavu till 8, Naatta Adavu 4 Steps, Pakka Adavu 1 step, Metta Adavu 1 Step, Kuditta Metta Adavu 4 Steps,

Practical-3: Practice sessions

Practical-

4: Tattu Kuditta Adavu (Metta), Tattu Kuditta Adavu (Metta) 2 Steps, Tirumanam Adavu 3 Steps, Kattu Adavu 3 Steps, Kattu Adavu 3 Steps

Practical-5: Practice sessions

Practical-6: Tirumanam (front) 3 Steps, Repeat of Tirumanam (Overhead) 3 Steps, Practical-

7: practice sessions

Practical-8: final practice sessions and performances.

**Recommended reading**

1. *Introduction to Bharata's Natyasastra*, Adya Rangacharya, 2011
2. *The Natyasastra and the Body in Performance: Essays on the Ancient Text*, edited by Sreenath Nair, 2015
3. *Bharatanatyam How to ... : A Step-by-step Approach to Learn the Classical Form*, Eshwar Jayalakshmi, 2011

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS02PR0105-02**

**Course Name: Fundamentals of Indian Classical Dance: Kathak**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

The course aims to introduce the students to Kathak, an important element of Indian traditional knowledge system. The course will not only provide the learning and skill to perform this art but would also enhance many mental and physical aspects of the students such as strength, flexibility, discipline, self-confidence, creativity, focus, coordination, etc.

**Course Outcomes**

**On completion of the course, students will be able to achieve the following:**

CO1: Understand the importance of dance and Kathak as an Indian dance form  
CO2: Develop skill to perform the dance form at its basic level.

CO3: Evaluate their strengths and interest to take bridge course to give *Prarambhik* (1<sup>st</sup> level formal exam of Kathak).

**Syllabus**

**Practical**

**1:** Orientation in Kathak. Correct posture of Kathak, Basic Movements and exercise Stepping, Chakkaro f5 count (Bhramari),

**Practical-2:** practice session of practical 1

**Practical -3:** Hastaks, Hastaks and Steppings, Reciting a samyukta Mudra shloka, Hastak and steppings

**Practical-4:** practice session of practical 3

**Practical-5:** Todas and Asamyukta hastamudra shlok, Vandana of Shlok, 2 Todas and Vandana, Ghanta Ki Tihai,

**Practical -6:** practice session of practical 5

**Practical**

**7:** 21 Chakkardar Toda and Ginnti Ki Tihai, 2 Todas and 1 Chakkardar Toda, practice sessions

**Practical-8:** Final performances.

**Recommended reading**

1. Kathak Volume 1 A "Theoretical & Practical Guide" (Kathak Dance Book), Marami Medh i & Debasish Talukdar, 2022, Anshika Publication (13 September 2022)

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :24HS02PR0105-03**

**Course Name: Introduction to Digital Photography**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

The course aims to develop basic skills of students in digital photography to lay a foundation for them as a hobby and/or a profession.

**Course outcome:**

**At the end of the course the students will be able to achieve the following:**

CO1: Develop an understanding of the technical aspects and aesthetics of Photography.  
CO2: Apply the rules of digital photography for creating photographs.  
CO3: Develop skills to enhance photographs through post processing.  
CO4: Create a portfolio of their photographs in selected genre.

**Syllabus**

Practical 1: Orientation in digital photography: Genres, camera handling and settings

Practical 2: Rules of Composition

Practical 3: Rules of Composition: practice sessions

Practical 4: Understanding Exposure and Art of Pre-Visualization

Practical 5: Rules of Composition and Art of Pre-Visualization: practice sessions

Practical 6: Post Processing Photographs and Portfolio creation

Practical 7: Post Processing Photographs: practice sessions

Practical 8: Portfolio finalization and presentation in selected genre.

**Reference material**

1. Scott Kelby (2020) *The Digital Photography Book: The Step-by-Step Secrets for how to Make Your Photos Look Like the Pros*, Rocky Nook, USA
2. Larry Hall (2014) *Digital Photography Guide: From Beginner to Intermediate: A Compilation of Important Information in Digital Photography*, Speedy Publishing LLC, Newark
3. J Miotke (2010) *Better Photo Basics: The Absolute Beginner's Guide to Taking Photos Like a Pro*, AMPHOTO Books, Crown Publishing Group, USA

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :24HS02PR0105-04**

**Course Name: Introduction to Basic Japanese Language**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

The course aims to develop basic communication skills in Japanese Language and help develop a basic understanding of Japanese culture in cross-cultural communication.

**Course outcome**

CO1: Gain a brief understanding about Japan as a country and Japanese culture. CO2: Develop ability to use vocabulary required for basic level communication in Japanese language.

CO3: Able to write and read the first script in Japanese language.

CO4: Able to frame simple sentences in Japanese in order to handle everyday conversations

CO5: Able to write in basic Japanese about the topics closely related to the learner.

**Syllabus**

Practical-1: Orientation about Japan, its language, and its culture

Practical-2: Communication Skills 1: Vocabulary for basic Japanese language

Practical -3: Practice sessions

Practical-4: Writing Skills 1: Reading and writing first script in Japanese

Practical-5: Practice sessions

Practical-6: Communication Skills 2: Framing sentences

Practical-7: Practice sessions

Practical-8: Writing Skills 2: Write basic Japanese and practice

**Recommended reading**

1. Marugoto Starter (A1) Rikai-Course Book for Communicative Language Competences, by The Japan Foundation, Goyal Publishers & Distributors Pvt. Ltd (ISBN: 9788183078047)
2. Japanese Kana Script Practice Book – Vol. I Hiragana, by Ameya Patki, Daiichi Japanese Language Solutions (ISBN: 9788194562900)

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :24HS02PR0105-05**

**Course Name Art of Theatre**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objectives:**

The course aims to develop in the students, an actor's craft through physical and mental training.

**Course Outcomes:**

**On completion of the course, students will be able to achieve the following:**

CO1: Understand and synthesize the working of the prominent genres of theatre across the world.

CO2: Apply the skill of voice and speech in theatre and public speaking

CO3: Apply the art of acting and also develop generic skills such as confidence, communication skills, self-responsibility, motivation, commitment, interpersonal skills, problem solving, and self-discipline.

CO4: Apply skills acquired related to technical/production aspects of theatre and also develop problem solving and interpersonal skills.

**Syllabus:**

**Syllabus**

Practical 1: Orientation in theatre

Practical 2: Voice and Speech training

Practical 3: Voice and Speech training: practice sessions

Practical 4: Art of acting

Practical 5: Art of acting: practice sessions

Practical 6: Art of script writing

Practical 7: Art of script writing: practice sessions

Practical 8: Final performances

**Reference books:**

1. Boleslavsky, R. (2022). *Acting: The First Six Lessons* (1st ed., pp. 1-92). Delhi Open Books.
2. Shakthi, C. (2017). *No Drama Just Theatre* (1st ed., pp. 1-171). Partridge.
3. Bruder, M., Cohn, L. M., Olnek, M., Pollack, N., Previto, R., & Zigler, S. (1986). *A Practical Handbook for the Actor* (1st ed.). Vinatge Books New York.



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :24HS02PR0105-06**

**Course Name Introduction to French Language**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective:**

To help build a foundation and interest in French languages so that the students can pursue the proficiency levels of the language in higher semesters.

**Course outcomes:**

**On successful completion of the course the students will be able to achieve the following:**

CO1. Demonstrate basic knowledge about France, the culture and similarities/differences between India and France

CO2. Learn to use simple language structures in everyday communication. CO3.

Develop ability to write in basic French about themselves and others. CO4. Develop ability to understand beginner level texts in French

**Syllabus**

List of Practicals

Practical-1: Orientation about France, the language, and culture

Practical-2: Communication Skills 1: Vocabulary building for everyday conversations

Practical-3: Practice sessions

Practical-4: Reading and writing Skills: Reading and writing simple text in French

Practical-5: Practice sessions

Practical-6: Communication Skills 2: listening comprehension

Practical-7: Practice sessions

Practical-8: Writing Skills: Write basic French and practice

**Recommended reading**

1. 15-minute French by Caroline Lemoine
2. Cours de Langue et de Civilisation Françaises by G. Mauger Vol. 1.1
3. Cosmopolite I by Natalie Hirschsprung, Tony Tricot

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code**24HS02PR0105-08

**Course Name**Art of Painting

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

Painting is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in painting to lay a foundation for them as a hobby and/or a profession.

**Course outcome:**

**At the end of the course the students will be able to achieve the following:**

CO1: Become familiar with the basic methods, techniques & tools of painting. CO2: Train the eye and hand to develop sense of balance, proportion and rhythm. CO3: Develop the ability to observe and render simple natural forms. CO4: Enjoy the challenging and nuanced process of painting.

**Syllabus**

Practical 1: Orientation in Painting tools & basics of lines, shapes, light, shadows and textures

Practical 2: The art of observation how to see shapes in drawing

Practical 3: Introduction Watercolor how to handle water paints

Practical 4: Introduction to acrylic color how to handle acrylic paints

Practical 5: Explore layering paint and capturing the quality of light with paint.

Practical 6: Create landscape painting

Practical 7: Create Abstract painting

Practical 8: Paint on Canvas (try to recreate any famous painting)

**Reference material**

1. Drawing made easy by Navneet Gala; 2015 the edition
2. Alla Prima I Everything I Know about Painting-- And More by Richard Schmid with Katie Swatland
3. Daily Painting: Paint Small and Often To Become a More Creative, Productive, and Successful Artist by Carol Marine

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code :24HS02PR0105-09**

**Course Name Art of Drawing**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective**

Drawing is fundamentally about learning to see, and to transport that vision onto paper through a variety of mark making techniques. This course aims to develop basic skills of students in drawing to lay a foundation for them as a hobby and/or a profession.

**Course outcome:**

**At the end of the course the students will be able to achieve the following:**

CO1: Become familiar with the basic methods, techniques & tools of drawing.  
CO2: Train the eye and hand to develop sense of balance, proportion and rhythm.  
CO3: Develop the ability to observe and render simple natural forms.  
CO4: Enjoy the challenging and nuanced process of drawing.

**Syllabus**

Practical 1: Orientation in Drawing tools & basics of lines, shapes, light, shadows and textures

Practical 2: The art of observation how to see shapes in drawing

Practical 3: One/ two-point basic linear perspective

Practical 4: Nature drawing and landscapes

Practical 5: Gestalt principles of visual composition

Practical 6: Figure drawing: structure and proportion of human body

Practical 7: Gesture drawing: expression and composition of human figures

Practical 8: Memory drawing: an exercise to combine the techniques learnt

**Reference material**

1. Drawing made easy by Navneet Gala; 2015 the edition
2. Perspective Made Easy (Dover Art Instruction) by Ernest R. Norling

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS02PR0105-10**

**Course Name: Nature camp**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Objective:** To create an opportunity for the students to develop affinity with nature and thus subsequently impact their ability to contribute towards sustainability of nature.

**Course outcome:**

After the completion of the course the students will be able to do the following:

CO1: Develop an affinity with nature by observing and understanding its marvels with guidance from experts

CO2: Develop an understanding of the challenges and solutions associated with nature and its conservation.

**Course content**

In collaboration with the Forest Department and/or a local NGO working in the field of environment conservation, this course would be conducted in 24 hours. Students will be taken to a tiger reserve in Central Indian region or Forest fringe villages or work with an NGO from Central Indian region working on natural resource management. The camps (for 2 days) will cover any one of the following topics as decided by the course coordinator:

1. Awareness about each element of biodiversity (camps on moths, butterflies, birds, other wildlife etc)
2. Environment management (water, forest, wildlife) – practices of Forest Department in managing a tiger reserve, and other aspects of water and forest conservation.
3. Sustainable natural resource management - initiatives by rural communities and local NGOs
4. Man-animal conflict and solutions (socio-economic and technical) – role of local communities and Forest Department
5. Traditional practices in environment conservation – role of local communities and local NGOs

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code:24HS02PR0105-11**

**Course Name: Developing Self-awareness**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Courseobjectives:**

Thecourseaimstodevelopstudentsintheirpersonalaswellasprofessionallifebymeansofgraphotherapy,NLP,and Neurobics

**CourseOutcomes:**

**Oncompletionofthecourse,studentswillbeabletoachievethefollowing:**

CO1: Gain foundational understanding of graphology and through self-analysis will achieve greater awarenessabouttheirstrengthsand weaknesses

&areasforpersonalgrowth

CO2:studentswillbeequippedwithtoolsandtechniquesforcontinuousself-improvement,usingsignatureanalysisand graphotherapyas partoftheirpersonaldevelopmentjourney

CO3:understandhowtouseNeuroLinguisticProgramming(NLP)

strategiestosetandachievegoalseffectively,overcomingmental blocks andlimitingbeliefs.

CO4:Enhanceabilitytoabsorb,retain,andrecallinformation,whichcanbenefitacademicandprofessionalperformance.

**Syllabus:**

Practical1: **ThePowerofHandwriting(HandwritingisBrainwriting)**

Practical2:**Knowyourselfthroughhandwriting**

Practical3: **TheRoleofSignatureinyourlife**

Practical4: **Graphotherapytoenhanceyourselfinalways**

Practical5:**NeurolinguisticProgramming,S.M.A.R.TGoal**

Practical 6: **Effective Communication Model, Rapport Building and Anchor**

Practical7:**BrainDirectives&LinguisticPresuppositions**

Practical8:**Neurobics**

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS02PR0105-12**

**Course Name: Art of Poetry**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Outcomes:**

To familiarize the students with the art of poetry and develop a sense of appreciation for the art

**At the end of the course the student will be able to achieve the following:**

CO1: Understand the origin and

development of

poetry CO2: Appreciate the art of poetry

in life

CO3: Develop an aesthetic sense

CO4: Develop a holistic perspective to their personality

**Syllabus**

Practical 1: **Art of poetry orientation**

Practical 2: **Forms of poetry – orientation**

Practical 3: **Forms of poetry – recitation**

Practical 4: **Application of poetry – orientation**

Practical 5: **Application of poetry – practical session**

Practical 6: **Poetry and aesthetics**

Practical 7: **Writing poetry – orientation**

Practical 8: **Writing poetry – writing sessions**

**Reading material**

**I. The Art of Poetry**

1. Fry, S. (2005). *The delectable journey: Unlocking the poetic mind*. HarperCollins.
2. Addonizio, K., & Laux, D. (1997). *The poet's companion: A guide to the pleasures of writing poetry*. W. W. Norton & Company.
3. Lucy, J. (Ed.). (2001). *The art of poetry*. Penguin Books.

**II. Understanding and Interpretation of Poetry**

1. Hirsch, E. (1999). *How to read a poem: And fall in love with poetry*. Harcourt Brace & Company.
2. Pinsky, R. (1998). *The sounds of poetry: A brief history*. Farrar, Straus and Giroux.
3. Meyer, M. (2005). *Poetry: An introduction*. Bedford/St. Martin's.

**III. Writing Poetry**

1. Hugo, R. (1979). *The triggering town: Lectures and essays on poetry and writing*. W. W. Norton & Company.
2. Bradbury, R. (1990). *Zen in the art of writing: Releasing the creative genius within you*. Bantam Books.

3. Behn, R., & Twichell, C. (Eds.).  
(1992). The practice of poetry: Writing exercises from poets who teach. HarperCollins.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS02PR0105-13**

**Course Name: Creative and content writing**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course objective:**

The objective of the course is to equip students with comprehensive skills in creative and content writing through experiential learning and real-world applications.

**Course outcomes:**

On completion of the course, student will be able to achieve the following:

**CO1:** Understand and apply fundamental concepts and techniques of creative writing.

**CO2:** Apply storytelling techniques to create engaging narratives.

**CO3:** Develop and implement effective SEO and digital content strategies

**CO4:** Create and refine content using various tools and applying diverse writing styles and formats.

**CO5:** Utilize digital tools to craft multimedia narratives and create a professional portfolio.

**Syllabus**

**Creative Writing**

Practical 1: Introduction to Creative and Content Writing

Practical 2: Character and Story Development

Practical 3: Crafting Compelling Narratives

**Content Writing**

Practical 4: SEO and Digital Content Strategies

Practical 5: Writing for Media

Practical 6: Tools

**Content Creation**

Practical 7: Digital Storytelling

Practical 8: Creative Portfolio Launch

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code:24HS02PR0105-14**

**Course Name: Science of life through Bhagwad Gita**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**CourseObjective**

The objective of the course is to seek directions from the Bhagwad Gita to garner life skills for a successful and happy life

**CourseOutcome**

CO1: To understand the methodology to correctly interpret and analyze the scripture

CO2: To understand the application of various teachings of the Bhagwad Gita

CO3: Use meditation and breathing techniques for a healthy mind and body.

**Syllabus**

Practical 1: Introduction to Bhagwad Gita-methodology

Practical 2: Real life application of chapter 1-3

Practical 3: Real life application of chapter 4-6

Practical 4: Real life application of chapter 7-9

Practical 5: Real life application of chapter 10-12

Practical 6: Real life application of chapter 13-15

Practical 7: Real life application of chapter 16-18

Practical 8: Meditation and breathing techniques



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS04PR0102-1**

**Course Name: Adventure Sports**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Objective:**

This course introduces adventure sports, emphasizing experiential learning through participation in various activities. The course will cover the fundamentals, safety procedures, and physical and mental benefits of adventure sports. Students will engage in outdoor activities such as wall climbing, rappelling, and more, fostering a connection with nature and understanding the principles of risk management.

**Syllabus:**

- Tent pitching, knot practice session and Tent allotment
- Activities like Jumaring and Climbing
- Individual challenge like Burma bridge, ladder bridge, multi-vine
- Group Task like improvisation, raft making and Kayaking
- activities like Archery, rifle shooting, cycle ride

**Pattern of Classes:** 2 Days and 1 Night Camp

**Course Outcome:** By the end of this course, students will:

- Understand the principles and benefits of adventure sports.
- Develop basic skills in selected adventure sports.
- Learn and apply safety measures and risk management techniques.
- Foster teamwork, leadership, and problem-solving skills.
- Cultivate a greater appreciation for nature and outdoor activities.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS04PR0102-2**

**Course Name: Introduction to Defense Forces & Obstacle Training**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Objective:**

- Understand the Structure and Function of Defense Forces
- Familiarize with Defense Force Training and Discipline
- Learn Basic Obstacle Course Techniques
- Apply Problem-Solving and Teamwork in Obstacle Training
- Explore the Role of Obstacle Training in Defense Preparedness

**Syllabus:**

- Knot and Hitch practice session
- Activities like Rappelling & Wall Climbing
- Burma bridge & ladder bridge
- First Aid
- Rifle Shooting
- Horse riding
- Group Task and Team building activities

**Pattern of Classes:** 2 Days and 1 Night Camp

**Course Outcome:**

Upon successful completion of the course, students should be able to:

- Describe the Structure and Function of Defense Forces
- Demonstrate Knowledge of Defense Training Protocols
- Navigate Basic Obstacle Courses
- Collaborate and Problem-Solve in Team-Based Exercises
- Connect Obstacle Training to Defense Preparedness
- Evaluate and Reflect on Training Experiences

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS04PR0102-3**

**Course Name: Self Defense & Indian Martial Arts**

**L : 0 Hrs., 0 : 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Objective:**

This course provides students with practical knowledge and skills in self-defense, focusing on personal safety and awareness. Students will learn basic techniques for self-defense, including striking, blocking, and evasion, while also discussing the legal and ethical considerations of self-defense. The course will emphasize both physical techniques and mental preparedness.

**Syllabus:**

**1. Mental Awareness**

- Importance of Self Defense
- Types of Self Defense
- Rules of Self Defense

**2. Physical Session**

- Various Self Defense Techniques
- Different Situational Defense Techniques

**3. Improvised Weapon**

- Knowledge and practice of different equipment's which can be used for self defense

**4. Martial Arts**

- Introduction of Indian Martial Arts
- Demonstration of Indian Martial Arts
- Training of Indian Martial Arts (Lathi Kathi)

**Pattern of Classes:** Training/Classes at Campus

**Course Outcome:** By the end of this course, students will:

- Understand the principles of personal safety and awareness.
- Learn and practice basic self-defense techniques.

- Develop strategies to avoid dangerous situations.
- Understand the legal and ethical implications of using self-defense.
- Build confidence and physical fitness through regular practice.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS04PR0102-4**

**Course Name: Basic Nutritional Course**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

**Course Objective:**

In the "Basics of Nutrition" course, students will develop a comprehensive understanding of essential nutrients and their roles in supporting overall health. They will learn to apply dietary guidelines effectively, tailoring recommendations to various age groups and health conditions. Additionally, students will cultivate the skills needed to assess and improve their own and others' eating habits for better health outcomes.

**Syllabus:**

**Unit I**

- Introduction to Nutrition – Define Balanced Diet, Nutrition, Optimum Nutrition, Nutrients, Concept of Health, Recommended Dietary Allowances (RDA)
- Carbohydrates (sources, functions and digestion)
- Proteins (sources, functions and digestion)
- Fats (sources, functions and digestion)
- Micronutrients (vitamins and minerals - sources, functions and digestion)

**Practical I**

- Display of all the foods with the help of students and while demonstrating teacher will again explain role and importance of nutrition in daily life. Deficiency will lead to chronic diseases and its prevention is very necessary for the quality of life.

**Unit II**

- What is Body Mass Index?
- What is Basal Metabolic Rate?
- What is Ideal Body Weight? (Male/Female)
- How to read label on Food Packets?
- How to choose smart food and Concept of Rainbow diet, My Food Pyramid or My plate given by ICMR-NIN.

**Practical III**

- Calculation of Body Mass Index, Basal Metabolic Rate, Ideal Body Weight (Male/Female) with the use of self-body measurements.  
Demonstration of Rainbow diet, My Food Pyramid or My Plate in a class

**Pattern of Classes:**

Theory Classes – 10

Practical Classes – 2

**Course Outcome:**

By the end of the course, students will be able to accurately describe the functions of key nutrients and their impact on health, create balanced meal plans based on established dietary guidelines, and critically evaluate nutrition information to distinguish between credible and misleading sources.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code:24HS01PR0103**

**Course Name: Introduction to Remedies by Ayurveda**

**L :0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course outcome:**

**At the end of the course the students will be able to achieve the following**

CO1: Know basic principle of Ayurvedic formulations.

CO2: Different types of Natural Remedies.

CO3: Basic idea about their Characterization

**Syllabus**

Module 1- Introduction to Ayurveda

Module 2- Different types of Ayurvedic formulations: Churn, Bhasma, Vati, Tailum

Module 3- Introduction to Methods of preparation

Module 4- Characterization, applications

**Practicals based on above syllabus**

- 1) Preparation of some medicinal oils like Bramhitel, Bramhi Awala, Vatnashak Tel, Bhurngraj Tel etc.
- 2) Preparation of Churn, like Trifala Churn, Hingastak Churn, Trikut Churn etc.
- 3) Preparation of some Bhasmas and vati

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS01PR0104**

**Course Name: Biodegradation of Kitchen Waste**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Outline:**

- 01. Module I :** Selection of material (i.e. Kitchen waste)
- 02. Module II:** Preparation of Compost by various Kitchen waste.
- 03. Module III:** Analysis of compost prepared.

**Syllabus:**

1. Composting
2. Types of composting
3. Important parameters of composting process
4. Effective ingredients required for composting
5. Benefits of composting
6. Kitchen waste
7. Ingredients required for making kitchen compost
8. Types of kitchen waste
9. Methods of kitchen waste composting
10. Analysis of kitchen waste compost
11. Bioenzymes: Preparation and uses

**Practical based on above syllabus:**

1. Practical method for preparing compost
2. Composting Technique
3. Bioenzyme Preparation
4. Grafting Technique
5. Rooting Technique

**Assessment of Students:**

Assessment of students will be done through theoretical assignments/seminars/Performance.

**Course Title**

**:Biodegradation of Kitchen Waste**

**Learning Outcomes:**

1. Allow students to learn about to create a sustainable and environmentally friendly way to manage organic waste and also to improve soil health.
2. This activity provides knowledge about how to transform organic waste material into a nutrient-rich soil amendment.
3. One of the startup opportunities.
4. Gives platform to become a research scholar understanding what is Research, Research papers, References, Paper publications, and further for Ph.D. work in solid waste management chemistry.

**Brief Description of the Course and Objectives:**

1. To recycle organic waste by composting.
2. To improve soil quality composting is a rich source of nutrients.
3. To reduce land fill waste composting reduces the amount of waste that ends up in landfills which help to reduce greenhouse gas emissions and conserve landfill space.
4. To reduce environmental pollution – organic waste that ends up in landfills can generate methane gas, a potent greenhouse gas that contributes to climate change. Composting of organic waste reduces the amount of methane that is produced.
5. To reduce the need for Synthetic fertilizers- uses of compost reduces the need of synthetic fertilizers though compost is very rich in nutrients.
6. Promote biodiversity, conserve water, reduce soil erosion.

**Objectives:**

The course aimed at imparting skills on organic composting competitive advantage over others validation of knowledge, increased confidence, enhanced credibility, imparts skill in synthesis strategies. Innovative characterization techniques of compost and chemical systems enhancing and enriching the students learning experience in the college and to bring about a more holistic approach to learning as well as to cultivate and develop necessary skills for various careers.

Tentative Budget for above course: 2000/- only



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24HS05PR0105**

**Course Name: Herbal Home Remedies: A Course for Self-Care**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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**Course Objectives:**

1. To identify and recognize common medicinal herbs and plants.
2. To understand the basics of herbalism and safety precautions.
3. To learn to prepare and use herbal remedies for common ailments.

**Course outcome:**

By the end of this course, students will be able to:

- Confidently identify and use local herbs for health benefits
- Increase their observational skills of natural objects
- Prepare and apply herbal remedies for self-care
- Integrate herbalism into daily routines for wellness

**Outline of Syllabus**

Module 1- Learn about sustainable foraging and gardening practices.

Module 2- Understand how to create a herbal home remedy kit

Module 3- Develop self-care routines using herbal remedies.

Practical/visit based on above syllabus.

### **Extended Activities**

Creating a Plant Collection, Awareness, Slogan, poem etc.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech I**

**Course Code: 24EE07PR0105**

**Course Name: Day to Day Electrical System**

**L : 0 Hrs., 0: 0 hr P : 2 Hrs., Per Week Credits: 1**

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### **Course Objective**

*: To make the students familiar with various electrical systems used in day to day life and create awareness about the operational safety.*

### **Course Outcomes:**

*After the successful completion of the course, students will be able to:*

*CO1: Understand the ratings of various domestic equipment, concept of energy efficiency and appreciate the necessity of electrical safety equipment.*

*CO2: Estimate the energy charges of residential installation*

*CO3: Explain the various components required in rooftop Solar PV*

*system. CO4: Compare the Electric two wheelers design and operational parameters.*

### **Activity Plan**

- 1. Identification of parameters of home appliances using the Power guard meter.*
- 2. Calculation and verification of the residential energy bill.*

3. *Energy efficiencies of home appliances – Introduction to Star ratings: Case Study.*
4. *Implementation of simple wiring used in residential installations.*
5. *Identification of components of Solar Photovoltaic system for residential consumers*
6. *Understanding the necessity and application of Earth Leakage Circuit breaker (ELCB) and Miniature Circuit Breaker (MCB) and Fuse.*
7. *Comparative study of Electric Two Wheelers (Market Survey).*
8. *Hands-on training of Digital meters.*

#### **Scheme of Examination:**

*Continuous Assessment based on report writing, Hands-on training participation and initiative and Viva.*

### **Ramdeobaba University, Nagpur Syllabus for Semester B.Tech I Department of Civil Engineering**

**Course Code : 24HS02TH0104**

**Course Name: Foundation course in Universal Human Values**

**L : 1 Hrs., P : 0 Hrs., Per Week      Credits: 01**

#### **Course Objectives:**

- To help the student see the need for developing a holistic perspective of life
- To sensitize the student about the scope of life – individual, family (inter-personal relationship), society and nature/existence
- To strengthen self-reflection
- To develop more confidence and commitment to understand, learn and act accordingly

#### **Course outcome:**

**On completion of course, students will be able to achieve the following:**

**CO1:** Develop a holistic perspective of life

**CO2:** Better understanding of inter-personal relationships and relationship with society and nature.

**CO3:** An ability to strengthen self-reflection

#### **Syllabus**

##### **Unit 1:- Aspirations and concerns**

**Need for Value Education:** Guidelines and content of value education.

**Exploring our aspirations and concerns:** Knowing yourself, Basic human aspirations, Need for a holistic perspective, Role of UHV; Self-Management: harmony in human being

### **Unit2:-Health**

Harmony of the Self and Body, Mental and physical health; Health for family, friends and society.

### **Unit3:-Relationships and Society**

Harmony in relationships, Foundational values: Trust, Respect, Reverence for excellence, Gratitude and love; harmony in society; harmony with nature.

### **Reference Material**

The primary resource material for teaching this course consists of

1. Text book: R.R Gaur, R Sangal, G P Bagaria, A foundation course in Human Values and professional Ethics, Excel books, New Delhi, 2010, ISBN 978-8-174-46781-2

4. Reference books:

- a) B L Bajpai, 2004, *Indian Ethos and Modern Management*, New Royal Book Co., Lucknow. Reprinted 2008.
- b) PL Dhar, RR Gaur, 1990, *Science and Humanism*, Commonwealth Publishers.
- c) Susan George, 1976, *How the Other Half Dies*, Penguin Press. Reprinted 1986, 1991
- d) Ivan Illich, 1974, *Energy & Equity*, The Trinity Press, Worcester, and Harper Collins, USA
- e) Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, *Limits to Growth*, Club of Rome's Report, Universe Books.
- f) Subhas Palekar, 2000  
*How to practice Natural Farming*, Pracheen (Vaidik) Krishi Tantra Shodh, Amravati.
- g) A Nagraj, 1998, *Jeevan Vidya ek Parichay*, Divya Path Sansthan, Amarkantak.
- h) E.F. Schumacher, 1973  
*Small is Beautiful: a study of economics as if people mattered*, Blond & Briggs, Britain.
- i) A.N. Tripathy, 2003, *Human Values*, New Age International Publishers.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code :24HS01TH0201**

**Course Name: Engineering Chemistry for Civil Engineers**

**L :3 Hrs., T-0, P :0 Hrs., Per Week Credits: 3**

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**Course outcomes:**

After completing the course, the students will be able to

CO1: Apply the knowledge of chemistry in water and wastewater technology and suggest the method of its treatment.

CO2: Develop first-hand knowledge of the cement production process and properties of cements and their types as modern material for constructions.

CO3: Understand of effect of various additives and admixtures on the behavior aspect of concrete.

CO4: Explain the principles of nanomaterials and its possible applications in various fields including the construction industry as well as uses of steel and its deterioration due to atmospheric reactions.

**Unit 1: Water Technology (6 Hrs)**

Introduction, types of water and impurities, Hardness of water, Alkalinity of Water, Conductivity, Characteristics of water, Indian Standard Codes for Potable, Irrigation, Industrial water, Process for Potable water, Desalination of seawater by reverse osmosis, Softening of Water for Boiler Feed Water using lime-soda and resins,

**Unit 2: Waste water technology (4 Hrs)**

Sources, characteristics and criterion for disposal of treated water, Primary, secondary and tertiary water treatment technique.

**Unit 3: Portland Cement (6 Hrs)**

General; Cement and lime; Chemical composition of ordinary Portland cement; Functions of cement ingredients; Water requirements for hydration; Types of cement and its properties; Setting and Hardening of Cement, Manufacturing of Cement, Dry Process and Wet Process, Grades of cement as per IS specifications, Various Types of Cement, Geopolymer bricks, etc.

**Unit 4: Additives and Admixtures for Concrete and Construction materials (6 Hrs)**

Additives and admixtures, types, necessity and benefit, Chemistry of different additives and admixtures

Mineral admixture - Fly ash, silica fume, blast furnace slag, and other pozzolanic materials.

Chemical admixtures - Accelerator, retarder, water reducing elements, plasticizer and super-plasticizer, other admixtures, their functions and dosage

## **Unit 5: Engineering Materials and Corrosion Science**

**(8 Hrs)**

Steels for structural designs: Metallurgy of Steels, Mechanical properties, Manufacturing of steel.

Nanomaterials: applications of nanomaterial in Construction Industries.

Corrosion: Cause of corrosion, types of Corrosion, factors affecting corrosion, Prevention of Corrosion, Effect of corrosion of steel on concrete.

### **Textbooks:**

1. *Text Book of Engineering Chemistry*, S. S. Dara, S. Chand and Company Ltd., New Delhi.
2. *Textbook of Engineering Chemistry*, P. C. Jain and Monica Jain, Dhanpat Rai and Sons, New Delhi.
3. *Text Book of Environmental Chemistry and Pollution Control*, S. S. Dara; S. Chand and Company Ltd., New Delhi.
4. *Textbook of Engineering Chemistry*, S. N. Narkhede, R. T. Jadhav, A. B. Bhake, A. U. Zadgaonkar, Das GanuPrakashan, Nagpur.
5. *Applied Chemistry*, A. V. Bharati and Walekar, Tech Max Publications, Pune.
6. Shikha Agrawal , *Engineering Chemistry : Fundamentals and Applications*, Cambridge University Press.
7. Dr. Rajshree Khare, *A Textbook of Engineering Chemistry(AICTE)*, S.K. Kataria& Sons

### **Reference Books**

1. *Engineering Chemistry by Gyngell*, McGraw Hill Publishing Company, New Delhi.
2. *Engineering Chemistry (Vol I)*, Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
3. *Engineering Chemistry (Vol II)*, Rajaram and Curiacose, Tata McGraw Hill Publishing Company, New Delhi.
4. *Engineering Chemistry*,Saraswat and Thakur, Vikas Publication, New Delhi.
5. *Engineering Chemistry*, B. S. Sivasankar, Tata Mcgraw Hill Publishing Company, New Delhi.
6. *Engineering Chemistry*, O. G. Palanna, Tata Mcgraw Hill Publishing Company, New Delhi.
7. *Engineering Chemistry*, R. Shivakumar, Tata Mcgraw Hill Publishing Company, New Delhi.
8. *Chemistry of Cement*, J. D. Lee, Mcgraw Hill Publishing Company, New Delhi.
9. *Advanced steel design of structures*, Srinivasan Chandrasekaran. 2019. CRC Press, Florida.
8. *The Chemistry of Nanomaterials: Synthesis, Properties and Applications*, C. N. R. Rao, A. Muller and A. K. Cheetham, Wiley-VCH, 2004.

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code :24HS01PR0201**

**Course Name: Engineering Chemistry for Civil Engineers Lab**

**L :0 Hrs., T-0, P :2 Hrs., Per Week Credits: 1**

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**Course outcomes:**

After completing the course, the students will be able to

CO1: Identify the various impurities present in water and wastewater samples and quantitatively estimate their amount.

CO2: Apply the knowledge of chemical principles for safe handling and uses of hazardous chemicals, and liquids fuels on the basis of their physical and chemical properties.

CO3: Demonstrate various analytical/spectroscopic tools for qualitative and quantitative analysis.

**List of Experiments: (Any eight experiments)**

1. Handling of various glassware, apparatus and Materials safety data sheets (MSDS) of hazardous materials.
2. To determine the types and extent of alkalinity in water/wastewater samples.
3. To estimate the water sample's temporary, permanent, and total hardness.
4. Estimation of copper in brass (Cu metal alloy) sample by using iodometry principles.
5. Determination of viscosities of lubricating oil using Redwood-Viscometer.
6. Determination of pH, turbidity and suspended solids in water/wastewater samples.
7. Estimation of Calcium in cement.
8. Quantitative analysis using Lambert-Beer's law using electronic spectroscopy.
9. Estimation of Ferrous and Ferric ions by Redox titration method.
10. Synthesis of Nano-material and determination of lambda max.
11. Determination of the Acid value of an oil.
12. Determination of the Saponification value of an oil.

**Text Books**

- 1) *A Textbook on Experiments and Calculations in Engineering Chemistry* by S. S. Dara, S. Chand Publications.
- 2) *Advanced Practical Physical Chemistry* by J. B. Yadav, Krishna's Prakashan Media(P)Limited.

**Reference Books:**

- 3) *Collection of Interesting General Chemistry Experiments*, A by A. J. Elias, Universities Press Publications.
- 4) *College Practical Chemistry* by V. K. Ahluwalia, S. Dhingra and A. Gulati, Universities Press Publications.
- 5) *Standard Methods for the Examination of Water and Wastewater*, American Public Health Association, American Water works Association, Water Environment Federation.



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code :24HS03TH0216**

**Course Name: Linear Algebra and Multivariate Calculus**

**L :3 Hrs., T: , P : 0 Hrs., Per Week**

**Credits: 03**

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**Course Objective:**

The objective of this course is to familiarize the prospective engineers with techniques in Calculus and multivariate analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**Course Outcomes**

On successful completion of the course, the students will able to:

1. Interpret the solutions of system of linear equations and use the concepts of Eigen values, Eigen vectors to find diagonalization of matrices, reduction of quadratic form to canonical form.
2. Evaluate definite and improper integrals using Beta, Gamma functions. Also trace Cartesian curves.
3. Solve multiple integration by change of order, change of variable methods and apply it to find area, volume, mass and center of gravity.
4. Understand geometric meaning of gradient, curl, divergence
5. Perform line, surface and volume integrals of vector-valued functions

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**Syllabus**

**Module 1: *Matrices*: (8 hours)**

Algebra of matrices, Inverse and rank of a matrix, rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigen values and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, Orthogonal transformation and quadratic to canonical forms, Introduction to n-dimensional space.

**Module 2: *Integral Calculus*: (8hours)**

Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Tracing of curves(Cartesian form)

**Module 3: *Multiple Integrals* (10 hours)**

Multiple Integration: Double and triple integrals (Cartesian and polar), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: area, mass and volume by double integration, Center of mass and Gravity (basic concepts).

**Module 4 : *Vector Calculus (Differentiation)*( 7hours)**

Scalar point function, Vector point function, vector differentiation, gradient, divergence and curl, directional derivatives with their physical interpretations, solenoidal and irrotational motions, Scalar potential function.

**Module 5 : Vector Calculus (Integration)(7 hours )**

Vector integration: Line integrals, work done, conservative fields, surface integrals and volume integrals, Stoke's theorem, Gauss divergence theorem, Green's theorem and their simple applications.

**Topics for self learning**

Rolle's theorem, Mean value theorems, Indeterminate forms, Applications of definite integrals to evaluate perimeter, area, surface areas and volumes of revolutions.

**Textbooks/References:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley & Sons, 2006.
2. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
3. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.
4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11<sup>th</sup> Reprint, 2010.
5. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Volume I & II, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India).
6. Biomedical Statistics -Shantikumar Yadav, Sompal Singh, Ruchika Gupta
7. Theory and Problems of Probability and Statistics - M.R. Spiegel (Mc Graw Hill) Schaum Series

**Shri Ramdeobaba College of Engineering and Management**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code: 24ES01TH0201**

**Course Name: Basics of Geotechnical Engineering**

**L : 3 Hrs., P : 0 Hrs., Per Week**

**Credits: 3**

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**Course Outcomes**

On successful completion of the course students will be able to;

1. Understand interrelationship between various properties of soil.
2. Formation and soils classification on the basis of Index properties
3. Identify the Permeability property and its effect on Seepage determination in soil.
4. Evaluate compressibility characteristics of soil
5. Evaluate in-situ & induced stresses in soils.
6. Evaluate Shear strength parameter of soil and its determination.

**Syllabus**

**Unit-I [5 hours]**

7. Introduction: formation of soil, Major deposits found in India. Various type of soil.
8. Phases of soil: Various soil weight & volume inter-relationship.

**Unit-II [4 hours]**

Index properties of soil and its application, I. S. classification system.

**Unit-III [4 hours]**

**Permeability:** Introduction to permeability & seepage, their importance, Factors affecting permeability, permeability of stratified soil. Characteristics & uses of flow nets, quick sand condition.

**Unit-IV [4 hours]**

**Compaction:** Mechanics of compaction, factors affecting compaction, field compaction equipment, quality control.

**Consolidation:** Introduction to consolidation & importance in settlement calculation.

## **Unit–V[4 hours]**

Stress Distribution: Stress distribution in soil mass, Boussinesq's theory, point load, Newmark's influence chart, and Equivalent point load method.

## **Unit–VI[5 hours]**

Shear Strength –Concept of Mohr's stress circle, Mohr-Coloumb's theory, Drainage condition, Pore pressure and its measurement, shear strength by direct shear test, tri-axial test, unconfined compression test, vane shear test.

### **Text Book**

1. Basics and Applied Soil Mechanics –Gopal Ranjan & ASR Rao, New Age Int. Pub.
2. Geotechnical Engineering –C Ventakramaiah, New Age International Publications
3. Soil Mechanics and Foundation Engineering –B.C. Punmia, Laxmi Publications
4. Textbook of Soil Mechanics & Foundation Engineering -VNS Murthy, CBS Publishers.

### **Reference**

1. Textbook of Geotechnical Engineering –Braja M. Das, Cengage Publications
2. Fundamentals of Geotechnical Engineering –Braja M. Das, Cengage Publications  
Modern Geotechnical Engineering –Alam Singh, CBS Publishers

**Shri Ramdeobaba College of Engineering and Management**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code : 24ES01PR0201**

**Course Name: Basics of Geotechnical Engineering Lab**

**L :0 Hrs., P : 2 Hrs., Per Week**

**Credits: 1**

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**Course Outcomes**

On successful completion of the course, students will be able to;

1. Identify and classify the soil.
2. Determine index properties of soil.
3. Determine coefficient of permeability soil.
4. Determine OMC and MDD of soil.
5. Determine shear strength parameters of soil.

**List of Practicals: Minimum 10 of the following**

1. Determination of moisture content by Oven drying method.
2. Determination of Free Swell Index of soil.
3. Determination of specific gravity of soil.
4. Field density determinations by Sand replacement method and Core cutter method.
5. Grain size distribution by Dry-Sieve Analysis.
6. Determination of Atterberg limits.
7. Determination of coefficient of Permeability by falling head test.
8. Determination of OMC & MDD by Standard Proctor's compaction Test.
9. Determination of Unconfined compression strength of clayey soil.
10. Determination of  $C-\phi$  parameters by Direct shear Test.
11. Triaxial compression test (Demonstration)
12. One field visit

**Shri Ramdeobaba College of Engineering and Management**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code : 24ES01TH0202**

**Course Name: Solid Mechanics**

**L :3 Hrs., P :0 Hrs., Per Week**

**Credits:3**

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**Course Outcomes:**

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

**CO1:** Understand fundamental concepts of stress, strain, and stress-strain behavior of materials.

**CO2:** Analyse axial force, shear force, and bending moment in statically determinant beams and plot SFD & BMD.

**CO3:** Apply simple bending theory to calculate bending and shear stresses in beams.

**CO4:** Analyse circular shafts and helical springs for torsional loading.

**CO5:** Calculate beam deflection and buckling of column using suitable methods.

**CO6:** Evaluate principle stress, principle strain and shear stress in two dimensional plane.

**Simple Stress and Strain:**

Concept of stress and strain, stress-strain behaviour of ductile and brittle material in uniaxial state of stress. Elastic, plastic and strain hardened zones, stress-strain relations, elastic constants, relation between elastic constants. Uniaxial loading and deformation of statically indeterminate problems under: axial loading, bars of varying section, composite bars, temperature stresses, temperature changes.

**Axial force, shear force and bending moment**

Types of load, determination of axial force, shear force and bending moment at a section in statically determinant beams. Plotting of shear force diagram and bending moment diagram.

**Bending and Shear Stress in beam**

Assumptions and derivation of simple bending theory, relation between bending moment, bending stress and curvature for homogeneous and composite beams. Bending and shear stresses with stress distribution in beams.

**Torsion of shafts**

Applications of the equation of the hollow and solid circular shafts, torsional rigidity, Combined torsion and bending of circular shafts, analysis of close-coiled -helical springs.

**Deflection of beams and buckling of columns**

Calculate slope and deflection using Macaulay's method and double integration method for determinant beams. Buckling of columns using Euler's formula.

**Principle stress and strain in two dimensions**

Transformation of stresses, principle stress and strain, maximum shear stress, Mohr's circle, combined bending and torsion.

**Text Books:**

1. S.S. Bhavikatti, Strength of Materials, 3rd Edition, Vikas Publishing House, 2008
2. A. Pytel and F. L. Singer, Strength of Materials, 4th ed.: Harper & Row, New York.
3. Uday Shankar dixit, Nelson Muthu and S.M. Kamal Strength of Materials, All India Council for Technical Education (AICTE), New Delhi, India
4. Strength of Materials a Rudimentary Approach: M.A. Jayaram, Sapna Book House, Bangalore.
5. Strength of Materials: S.Ramamrutham, Dhanpat Rai and Sons, New Delhi

**Reference Books:**

1. Seely, F. B.; and Smith, J.O "Advanced Mechanics of Material", John Wiley and Sons. Inc.
2. Mechanics of materials: Beer &Johntson, McGraw - Hill Publishers.e of Engineering & Management, Nagpur Programme Scheme & Syllabi For B. E. (Civil Engineering)

**Shri Ramdeobaba College of Engineering and Management**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code : 24ES01TP0202**

**Course Name: Solid Mechanics Lab**

**L :0 Hrs., P :2 Hrs., Per Week**

**Credits:1**

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**Course Outcomes:** Students will be able to

CO1. Understand the importance of elastic properties of various metals.

CO2. Examine the behavior and failure pattern of various metals under loading conditions such as tension, compression, bending, torsion, shear etc.

CO3. Examine the deflected shape of statically determinate beam.

CO4. Compare the buckling shape of Column under various end condition.

**Practical's: Minimum eight of the following:**

1. Study of elastic properties of metals.
2. Tension test on metals.
3. Compression test on metals.
4. Shear test on metals
5. Hardness test on metals.
6. Torsion test on metals.
7. Impact test on metals.
8. Deflection of springs.
9. Bending test on beam.
10. Verification of SFD and BMD by graphical solution.
11. Measurement of deflections in statically determinate beam
12. To study behavior of different types of struts and compare the Euler's buckling load for different end conditions.

**Reference Material:**

1. S.S. Bhavikatti, Strength of Materials, 3rd Edition, Vikas Publishing House, 2008
2. Strength of Materials: S.Ramamrutham, Dhanpat Rai and Sons, New Delhi
3. Strength of Materials: S.S.Rattan McGraw Hill Education India Pvt Limited, 2008



**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code : 24ES01TH0203**

**Course Name: Building Services**

**L : 03 Hrs., P : 0 Hrs., Per Week**

**Credits: 3**

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**Course Outcome**

1. The Students will be able to identify pipe fitting & system required for single & multistoried buildings.
2. The Students will be able to identify sanitary fittings & systems required for single & multistoried buildings and prepare water supply & sanitary drawings for single & multistoried buildings as per NBC 2016.
3. The Student will be able to analyze HVAC system of the building.
4. The Students will be able to evaluate the fire fighting system of a building.
5. The Students will be able to understand basics of electrification in a building.
6. Students will be able to understand the fundamental concept of the building Acoustic

**Unit - I**

**Water supply:** Introduction, types of sources Domestic water distribution system, reservoirs, supply system layouts, Layout of domestic water piping systems, joints, fittings and valves. Cold & hot water lines in buildings, Water supply to high rise buildings: problems encountered & systems adopted.

Planning of bathrooms, lavatory blocks and kitchen in domestic and multi-storied buildings. Preparation of plumbing drawings, symbols commonly used in these drawings. Introduction to De-centralized water Treatment units, water drainage and Rain Water Harvesting.

**Unit - II**

**Building Sanitation:** Principles of sanitation, collection and disposal of various kinds of refuse from buildings. House drainage system, Specifications and installation of sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings. Uses of gate valve, float valve, flap valve, ball valve, flush valve, etc, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', floor/bottle traps used in buildings.

**Unit - III**

**Fire control systems;** Causes of fire in buildings – Safety regulations – NBC 2016 – Planning considerations in buildings like non-combustible materials, staircases and lift lobbies, fire escapes and A.C. systems. Heat and smoke detectors – Fire alarm system.

#### **Unit - IV**

Lifts, Escalators, Freight elevators, Passenger elevators, Hospital elevators.

#### **Unit -V**

Basics of electrification in a building– Single-phase and three-phase supply – Protective devices in electrical installations – Earthing for safety – Types of earthing – ISI specifications – Types of wires, wiring systems, and their selection.

#### **Unit -VI**

Requirement of good Acoustic, sound absorbing material, Factors to be followed for noise control in residential building.

#### **Text Books**

1. Plumbing Engineering. Theory, Design and Practice, S.M. Patil, 1999
2. SP 7 : 2016, National Building Code of India 2016 (NBC 2016), <https://bis.gov.in/index.php/standards/technical-department/national-building-code/>
3. ISHRAE Handbook
4. Building Acoustics by Tor Erik Vigran, CRC Press; 1st Edition 2008.
5. V.K. Jain, Handbook of Designing and Installation of Services in High Rise Building & Complexes, Khanna Publication, New Delhi.

#### **Reference Books**

1. F. Hall, Roger Greeno, Building Services Handbook: Incorporating Current Building and Construction Regulations.
2. Building Services Research and Development Association Staff Building Services Materials Handbook -Heating, Sanitation and Fire Rout ledge
3. E.C. Butcher and A.C. Parnell. Designing for Fire safety.
4. Peter R. Smith and Warden G. Julian, Building Services.

Assignment:

1. Study of building drawing representing domestic water piping systems.
2. Study of building drawing representing sanitary & drainage systems.
3. Study of building drawing representing fire fighting system
4. Study of building drawing as per HVAC requirements.

Prepare building drawing with water supply & sanitary requirement as per NBC 2016.

**Ramdeobaba University, Nagpur**  
**Syllabus for Semester B.Tech II**  
**Department of Civil Engineering**

**Course Code : 24HS02TH0103**

**Course Name: Foundation Literature of Indian Civilization**

**L : 2 Hrs., P : 0 Hrs., Per Week      Credits: 02**

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**Course outcome:**

**At the end of the course the students will be able to achieve the following:** **CO1:** Understand the Indian knowledge system and its scientific approach

**CO2:** Get introduced to the Vedic corpus and recognize the multi-faceted nature of the knowledge contained in the Vedic corpus

**CO3:** Understand the salient features of the philosophical systems of the Vedic and non-Vedic schools

**CO4**

**: Develop a basic understanding of the ancient wisdom recorded in various Indian literary work**

**Syllabus**

1. **Unit 1: Overview of Indian Knowledge System:** Importance of ancient knowledge, defining IKS, IKS classification framework, Historicity of IKS, Some unique aspects of IKS.
2. **Unit 2: The Vedic corpus:** Introduction of Vedas, four Vedas, division of four Vedas, six Vedangas, Distinct features of Vedic life.
3. **Unit 3: Indian Philosophical systems:** Development and unique features, Vedic schools of philosophy, *Samkhya* and *Yoga* School of philosophy, *Nayaya* and *Vaisesika* school of philosophy, *Purva-mimamsa* and *Vedanta* schools of Philosophy, Non-vedic philosophies: Jainism, Buddhism, and other approaches
4. **Unit 4: Indian wisdom through ages:** *Panchatantras*, *Purans*: contents and issues of interests, *Itihasa*: uniqueness of the two epics (Ramayan and Mahabharata), Key issues and messages from Ramayana, Mahabharata – a source of worldly wisdom; **Indian ancient Sanskrit literature:** *Kalidas*, *Vishakadutta*, *Bhavbhuti*, *Shudraka*\*

**\*any one text as decided by the course teacher**

**Reference material**

1. B. Mahadevan, Vinayak Rajat Bhar, Nagendra Pavana R.N., *“Introduction to Indian Knowledge System: Concepts and Applications”* PHI, 2022
2. S.C. Chatterjee and D.M. Datta, *An introduction to Indian Philosophy*, University of Calcutta, 1984

**Ramdeobaba University, Nagpur**  
**Department of Civil Engineering**  
**Syllabus for Semester B.Tech II**

**Course Code :24HS04PR0202**

**Course Name: Sport-Yoga-Recreation**

**L : Hrs., P : 2 Hrs., Per Week**

**Credits: 1**

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**Aim of the Course**

The course aims at creating awareness about the fundamentals of Physical Education, Sports, Yoga, Recreation and its effectiveness to promote Health and wellness through Healthy Lifestyle.

**Objectives of the Course**

1. To impart the students with basic concepts of Sports, Yoga and Recreational activities for health and wellness.
2. To familiarize the students with health-related Exercise and evaluate their Health-related Fitness.
3. To make Overall growth & development with team spirit, social values and leadership qualities among students through various sports, games and Yogic activities.
4. To create Environment for better interaction and recreation among students as neutralizer for stress through various minor and recreational games.

**Course Outcomes:**

**On completion of the course, students will be able to:**

1. Understand fundamental skills, basic principle and practices of sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of physical exercises and yoga.
3. Develop Health-related fitness and Body-mind co-ordination through various fitness activities, sports, recreational games and yoga.
4. practice Healthy & active living with reducing Sedentary Lifestyle.

**Course Content:**

**Unit 1:- Practical Exercises for Health and Wellness**

- Warm-Up and Cool Down - General & Specific Exercises
- Physical Fitness Activities
- Stretching Exercises
- General & Specific Exercises for Strength, Speed, Agility, Flexibility, coordinative abilities

- Cardiovascular Exercises
- Assessment of BMI
- Relaxation techniques
- Physical Efficiency Tests

## **Unit 2:-Yoga**

- Shukshma Vyayam
- Suryanamaskar
- Basic Set of Yogasanas—Sitting, standing, supine and prone position
- Basic Set of Pranayama & Meditation

## **References:**

1. Russell, R.P. (1994). *Health and Fitness Through Physical Education. USA: Human Kinetics.*
2. Uppal, A.K. (1992). *Physical Fitness. New Delhi: Friends Publication.*
3. AAPHERD "Health related Physical Fitness Test Manual." 1980 Published by Association drive Reston Virginia
4. Kumar, Ajith. (1984) *Yoga Pravesha. Bengaluru: Rashtrothanna Prakashana.*
5. Dr. Devinder K. Kansal, *A Textbook of Test Evaluation, Accreditation, Measurements and Standards (TEAMS' Science)*

**Proposed RBU Civil Engineering Scheme (2025-26 Batch)**  
**With provision for Accelerated and Extended Degree Programmes to Enhance Academic Flexibility**

To provide greater academic flexibility for students, the following degree pathways are proposed:

### **1. Accelerated Degree Programme**

Under the accelerated degree programme, students can complete their degree in **three years** instead of the regular four-year duration.

- Courses typically offered in the **seventh and eighth semesters** (including the provision for one semester of internship or project work) may be completed during the **first to sixth semesters**.
- Students may fulfill the required credits through **MOOC courses** or by enrolling in **summer term offerings**.

### **2. Extended Degree Programme**

Under the extended degree programme, students are allowed to register for lesser number of courses and remaining courses are completed in an **additional two semesters** beyond the regular course duration.

- This additional time can be utilized for completing **internships or apprenticeships** to enhance their skills and improve employability.

