



RBU

RAMDEOBABA UNIVERSITY, NAGPUR
Formerly Shri Ramdeobaba College of Engineering & Management (RCOEM) Est. 1984

LEARN | INNOVATE | ACCOMPLISH

**RAMDEOBABA UNIVERSITY
NAGPUR-440013**

School of Engineering Sciences

PROGRAMME SCHEME & SYLLABI

2026 –2027 I Year

B.Tech. (CIVIL ENGINEERING)

Ramdeobaba University, Nagpur.
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech (Civil Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester – I

Course Code	Category	Name of Course	Lecture (Hours)	Practical (Hours)	Credits	CA	ESE/Internal Evaluation	Total	ESE Duration
26HS01TP0101	BSC-T&P	Engineering Chemistry	2	2	3	100	50	150	2
26HS03TH0101	BSC-T	Engineering Mathematics-I	3	0	3	50	50	100	3
26ES01TH0101	ESC-T	Engineering Mechanics	3	0	3	50	50	100	3
26ES01TP0102	ESC-T&P	Computational Methods in Civil Engineering	2	2	3	100	50	150	2
26ES01TH0103	ESC-T	Building Components & Construction	2	0	2	50	50	100	2
26ES01PR0104	VSEC-P	Engineering Drawing and Drafting (AutoCAD)	0	4	2	50	-	50	-
26HS02TP0101	AEC-T&P	Foundations of Business English	2	2	3	100	50	150	2
26HS02PR0102	CC-P	Liberal/Performing Art	0	2	1	50	-	50	-
26HS02TH0103-2	VEC	Foundational Course in Universal Human Values	1	0	1	50	-	50	-
			15	12	21	600	300	900	14

Ramdeobaba University, Nagpur.
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech(Civil Engineering)NEP-2020 based
To be implemented from Session: 2026-27
Syllabus and Scheme for Liberal/Performing arts basket

Sr. no.	Course Code	Course Title	Lecture	Practical	Credits	Continuous Evaluation	End Sem Exam/ Internal Evaluation	Total	ESE Duration
1	26HS02PR0102-2	Fundamentals of Indian Classical Dance: Bharatnatayam	0	2	1	25	25	50	N/A
2	26HS02PR0102-3	Fundamentals of Indian Classical Dance: Kathak	0	2	1	25	25	50	N/A
3	26HS02PR0102-4	Introduction to Digital Photography	0	2	1	25	25	50	N/A
4	26HS02PR0102-5	Introduction to Basic Japanese Language	0	2	1	25	25	50	N/A
5	26HS02PR0102-6	Art of Theatre	0	2	1	25	25	50	N/A
6	26HS02PR0102-7	Introduction to French Language	0	2	1	25	25	50	N/A
7	26HS02PR0102-8	Introduction to Spanish Language	0	2	1	25	25	50	N/A
8	26HS02PR0102-9	Art of Painting	0	2	1	25	25	50	N/A
9	26HS02PR0102-10	Art of Drawing	0	2	1	25	25	50	N/A
10	26HS02PR0102-11	Nature Camp	0	2	1	25	25	50	N/A
11	26HS02PR0102-12	Developing Self-awareness	0	2	1	25	25	50	N/A
12	26HS02PR0102-13	Art of Poetry	0	2	1	25	25	50	N/A
13	26HS02PR0102-14	Creative and Content Writing	0	2	1	25	25	50	N/A
14	26HS02PR0102-15	Science of life through	0	2	1	25	25	50	N/A

		Bhagwad Gita							
15	26HS02PR0102-16	Sanskrit Sambhashan-Spoken Sanskrit	0	2	1	25	25	50	N/A
16	26HS02PR0102-17	Kirtan Kala	0	2	1	25	25	50	N/A
17	26HS02PR0102-18	Introduction to German Language and Culture	0	2	1	25	25	50	N/A
18	26HS02PR0102-19	Adventure Sports	0	2	1	25	25	50	N/A
19	26HS02PR0102-20	Introduction toDéfense Forces &Obstacle Training	0	2	1	25	25	50	N/A
20	26HS02PR0102-21	First Aid & DisasterManagement	0	2	1	25	25	50	N/A
21	26HS02PR0102-22	Basic NutritionalCourse	0	2	1	25	25	50	N/A
22	26HS02PR0102-23	Stress ManagementThrough Yoga &Meditation	0	2	1	25	25	50	N/A
23	26HS02PR0102-24	Audio Recording & Dubbing	0	2	1	25	25	50	N/A
24	26HS02PR0102-25	Art of Basic Flim Makeing	0	2	1	25	25	50	N/A

Ramdeobaba University, Nagpur.
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech(Civil Engineering)NEP-2020 based
To be implemented from Session: 2026-27

Semester-II

Course Code	Category	Name of Course	Lecture (Hours)	Practical (Hours)	Credits	CA	ESE/Internal Evaluation	Total	ESE Duration
26HS05TP0201	BSC-T&P	Applied Physics	2	2	3	100	50	150	3
26HS03TH0211	BSC-T	Engineering Mathematics-II	3	0	3	50	50	100	3
26ES01TP0201	ESC-T&P	Basics of Surveying	3	2	4	100	50	150	3
26ES01TP0202	PCC-T&P	Solid Mechanics	3	2	4	100	50	150	3
26ES01TH0203	VSEC-T	Building Services	3	0	3	50	50	100	3
26HS02TH0205	IKS-T	Foundational Literature for Indian Civilization	2	0	2	50	50	100	2
26HS04PR0201	CC-P	Health-FitnessWellbeing (HFW)	0	2	1	50	-	50	-
			16	08	20	500	300	800	17

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

Ramdeobaba University, Nagpur.
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech (Civil Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester-III

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01TP0301	PCC-T&P	Fluid Mechanics-I	3	2	4	100	50	150	3
26ES01TP0302	PCC-T&P	Concrete Technology	3	2	4	100	50	150	3
26ES01TP0303	PCC-T&P	Structural Analysis	3	2	4	100	50	150	3
26ES01TH0304	MDM-T	Multi Disciplinary Minor - I	3	0	3	50	50	100	3
	OE-T	Open Elective – I	2	0	2	50	50	100	2
26ES01TH0305	MGMT-T	Finance Management for Civil Engg. projects	2	0	2	50	50	100	2
26ES01PR0306	FP-P	Mini Project	0	4	2	50	-	50	-
26ES01PR0307	CCA	Prompt Engineering	0	2	1	50	-	50	-
			16	12	22	550	300	850	16

Ramdeobaba University, Nagpur
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech (Civil Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester-IV

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01TP0401	PCC-T&P	Water Supply Engineering	3	2	4	100	50	150	3
26ES01TP0402	PCC-T&P	Reinforced Concrete Structures	3	2	4	100	50	150	3
26ES01TP0403	PCC-T&P	Basic of Geotechnical Engineering	3	2	4	100	50	150	3
26ES01TH0404	MDM-T	Multi Disciplinary Minor - II	3	0	3	50	50	100	3
	OE-T	Open Elective – II	3	0	3	50	50	100	3
26ES01TH0405	MGMT-T	Construction Engineering & Management	3	0	3	100	50	150	3
26ES01PR0406	VSEC	Software Skill-I (3D Modelling)	0	2	1	50	-	50	-
25HS04PR0401	*Audit	Self-Défense & Indian Martial Arts	0	*2	0	-	-	-	-
			18	8+2(audit)	22	550	300	850	18

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

RamdeobabaUniversity, Nagpur.
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech(Civil Engineering)NEP-2020 based
To be implemented from Session: 2026-27

Semester-V

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01TP0501	PCC-T&P	Transportation Engineering	3	2	4	100	50	150	3
26ES01TP0502	PCC-T&P	Waste Water Engineering	3	2	4	100	50	150	3
26ES01TP0503	PCC-T&P	Estimating & Costing	3	2	4	100	50	150	3
26ES01TH0504	PCC-T	Hydrology and Water Resources Engineering	3	0	3	50	50	100	3
26ES01TH0505	PEC-T	Program Elective-T	3	0	3	50	50	100	3
26ES01TH0506	MDM-T	Multi Disciplinary Minor - III	3	0	3	50	50	100	3
	OE-T	Open Elective – III	2	0	2	50	50	100	2
			20	6	23	500	350	850	20

Ramdeobaba University, Nagpur
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech (Civil & Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester-VI

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01TP0601	PCC-T&P	Design of Steel Structures	3	2	4	100	50	150	3
26ES01TH0602	PCC-T	Foundation Engineering	3	0	3	50	50	100	3
26ES01TP0603	PCC-T&P	Fluid Mechanics –II	3	2	4	100	50	150	3
26ES01TP0604	PEC-T&P	Program Elective – II	3	2	4	100	50	150	3
26ES01TH0605	PEC-T	Program Elective - III	3	0	3	50	50	100	3
26ES01TH0606	MDM-T	Multi Disciplinary Minor - IV	3	0	3	50	50	100	3
26ES01PR0607	VSEC-P	Software Skill-II (BIM)	0	2	1	50	-	50	-
26ES01PR0608	CCA	Civil Engineering Standards & Specifications	1	0	1	50	-	50	-
			19	08	23	550	300	850	18

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

RamdeobabaUniversity, Nagpur.
Department of Civil Engineering
Teaching and Evaluation SchemeB.Tech (Civil Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester-VII

Course Code	Category	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01TP0701	PEC-T&P	Program Elective - IV	3	2	4	100	50	150	3
26ES01TH0702	PEC-T	Program Elective - V	3	0	3	50	50	100	3
26ES01TH0703	CCA	Participative Learning	1	0	1	-	-	-	-
26ES01TH0704	PCC-T	Advanced Concrete Structures	3	0	3	50	50	100	3
26ES01TH0705	PCC-T	Irrigation Engineering	3	0	3	50	50	100	3
26ES01PR0706	Project-P	Minor Project	0	8	4	100	-	100	
26ES01TH0707	CCA	Software Skill-III (Design)	0	2	1	50	-	50	
			13	12	19	400	200	600	12

Ramdeobaba University, Nagpur
Department of Civil Engineering
Teaching and Evaluation Scheme B.Tech (Civil Engineering) NEP-2020 based
To be implemented from Session: 2026-27

Semester-VIII

Course Code	Category	Name of Course	Lecture		Practical	Credits	Theory Course				Practical Course		
							CA	ESE	TOTAL	ESE Duration	CA	ESE	Total
Option 1 - Project													
26ES01PR0801	VEC/ Project-P	Major Project	0		12	6					100	100	200
26ES01TH0802	PCC-T	Contracts Account and Work Management	3		0	3	50	50	100	3			
26ES01TH0803	PEC-T	Program Elective - VI	3		0	3	50	50	100	3	-	-	
			6		12	12	100	100	200	6	100	100	200
Option 2 – Industry Internship													
26ES01PR0801	II-P	Industry Internship	0		24	12					100	100	200
Option 3 - Research Internship													
26ES01PR0801	RI-P	Research Internship	0		18	9					100	100	200
26ES01TH0802	PCC	Research Methodology	3		0	3	50	50					
			3		18	12							
Option 4 - TBI Internship													
26ES01PR0801	TBI	TBI Internship	0		24	12					100	100	200

Breakup of Semester wise Credits*

Semester	Lecture	Practical	Credits
1	15	12	21
2	16	08	20
3	16	12	22
4	18	8	22
5	20	6	23
6	19	8	23
7	13	12	19
8	6	12	12
Total	123	78	162

***The Course Code & Course name may be changed based on the approval of the Board of Studies experts &committee**

Program Elective courses basket

Se me ste r	PE	Construction Management	Environment al Engineering	Structural Engineering	Geotechnical Engineering	Transportatio n Engineering	Recent trends	Water Resources
V	(PE - I)(T)	Advanced Concrete Technology	Environmental Management	Advanced Structural Analysis	Geotechnical Explorations	Railway Engineering	Introduction to AI	Introduction to Piping and Plumbing Engineering
VI	(PE - II)(T& P)	Advanced Construction Techniques	Adv. Water and wastewater treatment	Retrofitting & Rehabilitation of Civil Infrastructure	Ground Impr ovement	Traffic Engineering and Management	Computer-Aided Design and Drafting (CADD)	Water Transmission and Distribution Syste m
VI	(PE - III)(T)	Urban Infrastructure	Solid Waste Management	Prestressed Concrete Structures	Advanced Geotechnical Engineering	Pavement Design	Basics of machine learning	Integrated water resources and management
VII	(PE - IV)(T& P)	Advance construction Materials	Industrial Waste Water Treatment	Earthquake Resistant Design of RCC Structures	Reinforced Earth	Urban Transportation Planning	Building Information Modelling	Climate Change & Mitigation
VII	(PE -V) (T)	Contracts Management	Air Pollution & Control	Bridge Engineering	Special Geotechnical Constructions	Airport Planning and Design	Numerical Method for Civil Engineers	Rural water supply and sanitation
VII	(PE - VI)(T)	Digital Technologies for Civil Engineers	Hazardous and E waste Management	Advanced Steel Structures	Earth and Rockfill Dams	Highway Construction And Management	Remote sensing and GIS	Environmental System Modelling

Participative Learning 1 Credit (12-14 Hours minimum)

Short Course, Workshop, Hands-on-training, Training Program, MOOC Courses 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.

Open Electives

Sr. No	Open Electives
1	Formwork Systems (10 Hours) Design of Formwork System (11 Hours) Construction Aspects of Formwork (10 Hours)
2	Introduction to Programming with MATLAB Linear Regression and Modeling
3	Construction Cost Estimating and Cost Control Construction of Metro Rail Systems Planning of Metro Rail Systems
3	Sustainable Construction in a Circular Economy Precast & Advanced Pile Foundation Transportation, Sustainable Buildings, Green Construction Urban Nature: Connecting Cities, Sustainability and Innovation
4	Foundation Systems, Monitoring and Erection Concrete Multi Storey Building – System Design Specialization Design Basics of RCC Buildings Course 1 Structural scheme setting and ETABS Analysis of RCC Building Course 2 Design and Detailing of RCC elements

MDM (Multi-Disciplinary Minor) courses Scheme

Track: Civil Engineering for Sustainable Development

Sr. No.	Sem	Course Code	Course Title	Hours/week			Credits	Maximum marks			ESE Duration (Hrs)
				L	T	P		Contin	uousEv	EndSe	
1	III	26ES01TH0305	Fundamentals of Civil Infrastructure and Construction	3	0	0	3	50	50	100	3
2	IV	26ES01TH0404	Construction Materials and Technology	3	0	0	3	50	50	100	3
3	V	26ES01TH0506	Green Building Construction and Environmental Systems	3	0	0	3	50	50	100	3
4	VI	26ES01TH0607	Building Construction Methods and Management	3	0	0	3	50	50	100	3
			TOTAL	12	0	0	12				

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

Discipline	Course Name	SME Name	Institute	Co-ordinating Institute
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 Chinnasamy	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

Ramdeobaba University, Nagpur

Department of Civil Engineering
B.Tech(Civil Engineering)NEP-2020 based
To be implemented from Session: 2026-27
Honors Teaching and Evaluation Scheme

Course Code	Name of Course	Lecture	Practical	Credits	CA	ESE	TOTAL	ESE Duration
26ES01HT0301	Construction Technology	3	0	3	50	50	100	3
26ES01HT0401	Fire fighting system	3	0	3	50	50	100	3
26ES01HT0501	Geotechnical Design	3	0	3	50	50	100	3
26ES01HP0501	Geotechnical Design Lab	0	2	1	25	25	50	-
26ES01HT0601	Foundation Design	3	0	3	50	50	100	3
26ES01HP0601	Foundation Design Lab	0	2	1	25	25	50	-
26ES01HP0701	Project	0	8	4	0	0	0	0
	Total	12	10	18	250	250	500	12

Minor Teaching and Evaluation Scheme

Course Code	Name of Course	Lecture	Practical	Credits				
					CA	ESE	TOTAL	ESE Duration
26ES01MT0301	Sustainable Engineering	3	0	3	50	50	100	3
26ES01MT0401	Disaster Management	3	0	3	50	50	100	3
26ES01MT0501	Engineering Ethics and Professional Practice	3	0	3	50	50	100	3
26ES01MP0501	Engineering Ethics and Professional Practice Lab	0	2	1	25	25	50	
26ES01MT0601	Basics of Civil Engineering	3	0	3	50	50	100	3
26ES01MP0601	Basics of Civil Engineering Lab	0	2	1	25	25	50	
26ES01MT0701	Project	0	8	4	0	0	0	0
	Total	12	12	18	250	250	500	

After 1st Year / 2nd Year / 3rd Year

Infrastructure/Real Estate/Industry Internship (1 Month)

Mini Project with report (1 Month)

Student will receive

Certificate after 1st year

Diploma after 2nd year

Degree after 3rd year

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

Course Code :26HS01TP0101

Course Name: Engineering Chemistry

L :2 Hrs., T-0, P :2 Hrs., Per Week Credits: 3

Course Outcomes

After successfully completing the course:

CO1: Students will be able to analyze impurities in natural water and apply chemical and membrane-based techniques for potable water production and boiler feed water softening, contributing to sustainable water management practices.

CO2: Students will be able to explain the manufacturing processes, chemistry, and types of cement, and evaluate the role of mineral and chemical admixtures in modifying concrete properties as per IS specifications for durable construction.

CO3: Students will be able to assess the size-dependent properties of nanomaterials and apply advanced materials such as nanosilica, CNTs, photocatalytic coatings, self-healing concrete, and geopolymer binders for sustainable infrastructure development.

CO4: Students will be able to understand corrosion theories, identify different types of corrosion in civil structures, and propose prevention strategies including material selection, design, protective coatings, and cathodic protection to enhance structural longevity.

CO5: Execute laboratory experiments, record observations with precision, and articulate critical analysis of findings for sustainable solutions.

Unit I: Water Technology

Introduction, Impurities in Natural water, Process for Potable water, Softening of Water for Boiler Feed Water using Ion-Exchange Resin Technique. Membrane Techniques.

Unit II: Construction Materials and Additives

Manufacturing of Cement, (raw materials, process parameters) Dry Process and Wet Process,

Chemistry of Concrete: Setting and Hardening of Cement,

Types of Cement - (OPC, Rapid hardening, low heat, Portland Pozzolana, etc.).

Grades of cement as per IS specifications

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

Chemical admixtures, their functions and dosage - Accelerator, Retarder, Plasticizer and Super-plasticizer.

Unit III: Advanced Engineering Materials

Size-dependent properties of nanomaterials, classification of nanomaterials, Applications of Nanosilica and CNTs in Construction Industries, Photocatalytic materials (TiO₂ coatings for self-cleaning surfaces), Smart materials: self-healing concrete, shape-memory alloys, Sustainability in construction: eco-friendly binders, geopolymer concrete.

Unit IV: Corrosion Science

Corrosion: theories of corrosion- Dry and Wet corrosion, Pilling-Bedworth Rule, Types of Corrosion- Pitting, Galvanic, Differential aeration, Water-line and stress corrosion, Prevention of Corrosion: Selection of materials, Proper designing and cathodic protection, Protective Coatings, Effect of corrosion on steel and 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 Ganu Prakashan, 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, Saraswat and Thakur, Vikas Publication, New Delhi.
4. Engineering Chemistry, B. S. Sivasankar, Tata McGraw Hill Publishing Company, New Delhi.
5. Chemistry of Cement, J. D. Lee, McGraw Hill Publishing Company, New Delhi.
6. Advanced steel design of structures, Srinivasan Chandrasekaran. 2019. CRC Press, Florida.
7. The Chemistry of Nanomaterials: Synthesis, Properties and Applications, C. N. R. Rao, A. Muller and A. K. Cheetham, Wiley-VCH, 2004.

Course Name: Engineering Chemistry for Civil Engineers Lab

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 I

Course Code: 26HS03TH0101

Course Name: Engineering Mathematics-I

L: 3Hrs., T: 0 Hrs., P: 0 Hrs., Per week

Total Credits: 03

Course Objective:

The objective of this course is to develop a strong foundation in differential equations, statistics, probability, and differential calculus, with a focus on their applications in Electrical Engineering. The course integrates theoretical concepts with computational lab-based experiments to enhance students' ability to model, analyze, and solve engineering problems using mathematical and simulation tools.

Course Outcomes

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

1. Solve and analyze first-order ordinary differential equations and apply them to model real-life engineering problems.
2. Formulate and solve higher-order differential equations using analytical techniques and interpret their applications.
3. Analyze and interpret engineering data using curve fitting, regression, and correlation

techniques to identify patterns and relationships.

4. Apply the concepts of Taylor's and Maclaurin's series, and optimization techniques to analyze and solve problems involving functions of single and multiple variables, including maxima and minima.
 5. Construct and solve partial differential equations related to engineering boundary value problems and simulate their behaviour using computational visualization techniques.
-

Theory Syllabus:

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

Exact, linear and Bernoulli's equations, Euler's equations, Equations 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 (7 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: (6 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 (8 hours)

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

Module 5: Partial differential equations(PDE) (8 hours)

Introduction to PDE , solution of homogeneous PDE, solution of PDE with separation of variables, Applications of partial differential equations.

Textbooks :

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

References:

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Volume I & II, Pune VidhyarthiGrihaPrakashan, Pune-411030 (India).
4. Paul Zimmermann, Computational Mathematics with Sagemath , siam publisher membranes.

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

Course Code : 26ES01TH0101

Course Name: Engineering Mechanics

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

Credits: 3

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.*
6. *F L Singer Engineering Mechanics Statics and Dynamics Indus Publisher.*

Ramdeobaba University, Nagpur
Department of Civil Engineering
Syllabus for Semester B.Tech I
Course Code : 26ES01TP0102

Course Name: Computational Methods in Civil Engineering
L :2 Hrs., P :2 Hrs., Per Week Credits: 3

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: Lists

Lists, numpy, using numpy for lists 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 edition.

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

Python in a Nutshell, Alex Martelli, O'Reilly, 2nd Edition.

Course Name: Computational Methods in Civil Engineering lab

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.

List of Practicals

1. Program for calculation of Area, Volume, Unit Conversion, etc.
2. Program to illustrate arithmetic and logical operators
3. Program to illustrate decision making
4. Program to illustrate looping structures
5. Program to illustrate various operations on matrices.
6. Program to illustrate use of functions
7. Program to illustrate plotting of various objects/shapes/markers.

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

Course Code :26ES01TH0103

Course Name: Building Components & Construction

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

Credits: 2

Course Outcomes:

After completion of course, students will be able to:

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

Types of Civil Engineering structures, Types of building with functions of each.

Unit II

Building elements: Introduction and functions of Foundations, Sub Structure and Super Structural element such as Plinth, Column, Beam, Lintel, Chajja,
Type of structure and its functions

Unit III

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

Construction Materials

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

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.

Unit IV

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

Roof: Types and functions of Roof

Flooring: Types and utility of Flooring

Text Books:

1. Building Construction: B. C. Punmia, Laxmi publication Pvt. Ltd. New Delhi and distributor, 10th 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 : 26ES01PR0104

Course Name: Engineering Drawing and Drafting (AutoCAD)

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

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 : 26HS02TP0101

Course Name: Foundations of Business English

L : 2 Hrs., P : 2 Hrs., Per Week Credits: 3

Course Objectives

The course aims to develop foundational communication skills required for academic and professional success by enhancing students' competence in grammar, vocabulary, speaking, listening, reading, and writing. It also seeks to familiarize learners with workplace communication practices and emerging AI-assisted communication tools, thereby improving their employability and readiness for professional contexts.

Course outcomes:

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

CO1: Apply and demonstrate active listening techniques and grammatical rules to construct accurate, coherent, and contextually appropriate communication.

CO2: Analyse and apply verbal aptitude strategies, business vocabulary, and reading comprehension techniques to interpret written communication effectively.

CO3: Demonstrate and adapt public speaking techniques and professional etiquette to deliver structured and audience-centric oral communication in workplace scenarios.

CO4: Evaluate and apply employability communication strategies by actively participating in group discussions, mock interviews, and résumé-building exercises to meet professional standards.

CO5: Create and justify professional documents using appropriate formats and ethically integrate AI-assisted tools to enhance clarity, accuracy, and effectiveness in communication.

Unit-1 Listening Comprehension and Remedial Grammar

5 Hours

Listening Comprehension: Active listening, Reasons for poor listening, Barriers to effective listening, Traits of a good listener, Note-making

Remedial Grammar: Common Errors in Indian English, Subject-verb agreement, Tenses

Unit-2: Structural Communication and Reading Comprehension

5 Hours

Verbal Aptitude: Para-jumbles, Analogies, Sentence completion, Syllogisms

Business Vocabulary: Use of power verbs, power adjectives and power adverbs, Common technical affixes, Avoiding corporate jargons

Reading Comprehension: Types and Strategies

Unit -3: Speaking Skills

5 Hours

Public Speaking: Mechanics of Public Speaking, Five-C model of storytelling (audience-centric), principles of effective introductions and welcome addresses, and questioning techniques.

Professional Oral Communication: Meetings, Seeking and giving feedback,

Professional Etiquette: greetings, introductions, politeness strategies, telephone and virtual communication

Unit -4: Communication for Employment

5 Hours

Group Discussions: concepts, types, roles, and evaluation parameters

Résumé Building: structure, content, and formatting techniques

Introduction to Interview Skills: types of interviews, commonly asked questions, and response strategies

Unit-5: Professional Communication

6 Hours

Principles of professional document design

Academic and professional email writing (format, tone, etiquette)

Instruction writing (clarity, sequencing, audience awareness)

Statement of Purpose (SOP): structure and content

Introduction to AI-assisted communication (AI prompts and applications) and Ethical considerations in the use of AI in professional communication

Books

1. *Communication Skills*. Sanjay Kumar and PushpLata. 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. *The AI Prompt Handbook for Business Writing: 50+ Prompts for Professionals, Managers & Entrepreneurs (The AI Prompt Handbook Series)*, Maxwell Striling, 2026

Foundations of Business English Lab

Syllabus

List of practicals

Computer Assisted + Activity Based Language Learning

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

Practical 2: Reading Skills

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

Practical 4: Pronunciation, Intonation, Stress, and Rhythm

Activity Based Language Learning

Practical 5: Public Speaking

Practical 6: Presentation Skills: Orientation

Practical 7: Presentation Skills: Mock

Practical 8: Group Discussions: Practice

Practical 9: Group Discussions: Mock

Reference Books

1. *Communication Skills*. Sanjay Kumar and Pushp Lata. Oxford University Press.
2. *Practical English Usage*. Michael Swan. OUP. 1995.

Ramdeobaba University, Nagpur

Department of Civil Engineering

Syllabus for Semester B.Tech I

Course Code: 26HS02PR0102-02

1 Course Name: Fundamentals of Indian classical dance: Bharatnatyam

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

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 Bharatnatyam as an Indian dance form

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

CO3: Evaluate their strengths and interest to take bridge course to give Pratham (1st level formal exam of Bharatnatyam).

Syllabus

Practical -1: Orientation in Bharatnatyam

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: Tatta Kuditta Adavu (Metta), Tatta Kuditta Adavu (Metta) 2 Steps, Tirmanam Adavu 3 Steps, Kattu Adav - 3 Steps, Kattu Adav - 3 Steps

Practical-5: Practice sessions

Practical-6: Tiramanam (front) 3 Steps, Repeat of Tiramanam (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: 26HS02PR0102-03

Course Name: Fundamentals of Indian Classical Dance:Kathak

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

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 skills to perform the dance form at its basic level.

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

Syllabus

Practical -1: Orientation in Kathak. Correct posture of kathak, Basic Movements and exercise Stepping, Chakkar of 5 count (Bhramari),

Practical -2: practice sessions of practical 1

Practical -3: Hastaks, Hastaks and Steppings, Reciting asamyukta Mudra shloka, Hastak and steppings

Practical -4: practice sessions of practical 3

Practical -5: Todas and Asamyukta hasta mudra shlok, Vandana of Shlok, 2 Todas and Vandana, Ghante Ki Tihai,

Practical -6: practice sessions of practical 5

Practical -7: 2 1 Chakkardar Toda and Ginnti Ki Tihai, 2 Todas and 1 Chakkardar Toda, practice sessions

Practical -8: Final performances.

Recommended reading

1. Kathak Volume1 A "Theoretical & Practical Guide" (Kathak Dance Book), Marami Medhi & Debasish Talukdar, 2022, Anshika Publication (13 September 2022)

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

Course Code :26HS02PR0102-04

Course Name: Introduction to Digital Photography

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

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) *BetterPhoto 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 :26HS02PR0102-05

Course Name: Introduction to Basic Japanese Language

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

Course objective

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

Course outcome

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

CO1: Basic understanding about Japan as a country and Japanese culture.

CO2: Ability to use vocabulary required for basic level communication in Japanese language.

CO3: Able to frame simple sentences in Japanese for everyday conversations

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: Basic day to day greetings in Japanese language and their usage through role-play

Practical-5: Practice sessions

Practical- 6: Communication Skills 2: framing sentences

Practical- 7: Practice sessions

Practical- 8: Introduction of Japanese Culture, Arts, Traditions, Etiquettes and Manners etc.

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. 1 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 :26HS02PR0102-06

Course Name: Art of Theatre

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

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 :26HS02PR0102-07

Course Name: Introduction to French Language

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

Course objective:

To help build a foundation and interest in French language 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 :26HS02PR0102-8

Course Name: Introduction to Spanish Language

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

Course objective:

To help build a foundation and interest in Spanish language 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 Spain, 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 Spanish about themselves and others.
- CO4. Develop ability to read and understand beginner level texts in Spanish

Syllabus

List of Practicals

Practical-1: Orientation about Spain, 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 Spanish

Practical-5: Practice sessions

Practical-6: Communication Skills 2: listening comprehension

Practical-7: Practice sessions

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

Recommended reading

1. 15-Minute Spanish by Ana Bremon
2. Aula Internacional 1 by Jaime Corpas ,Eva Garcia, Agustin Garmendia.
3. Chicos Chicas Libro del Alumno by María Ángeles Palomino

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

Course Code26HS02PR0102-09

Course Name: Art of Painting

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

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 Water color** - how to handle water paints

Practical 4: **Introduction to acrylic colors** - 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; 2015th edition
2. Alla Prima II 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 :26HS02PR0102-10

Course Name: Art of Drawing

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

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 proportions of human body

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

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

Reference material

1. Drawing made easy by Navneet Gala; 2015th 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: 26HS02PR0102-11

Course Name: Nature camp

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

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 it 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:26HS02PR0102-12

Course Name: Developing Self-awareness

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

Course objectives:

The course aims to develop students in their personal as well as professional life by means of graphotherapy, NLP, and Neurobics

Course Outcomes:

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

CO1: Gain foundational understanding of graphology and through self-analysis will achieve greater awareness about their strengths and weaknesses & areas for personal growth

CO2: students will be equipped with tools and techniques for continuous self-improvement, using signature analysis and graphotherapy as part of their personal development journey

CO3: understand how to use Neuro Linguistic Programming (NLP) strategies to set and achieve goals effectively, overcoming mental blocks and limiting beliefs.

CO4: Enhance ability to absorb, retain, and recall information, which can benefit academic and professional performance.

Syllabus:

Practical 1: **The Power of Handwriting (Handwriting is Brainwriting)**

Practical 2: **Know yourself through handwriting**

Practical 3: **The Role of Signature in your life**

Practical 4: **Graphotherapy to enhance yourself in all ways**

Practical 5: **Neurolinguistic Programming , S.M.A.R.T Goal**

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

Practical 7: **Brain Directives & Linguistic Presuppositions**

Practical 8: **Neurobics**

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

Course Code: 26HS02PR0102-13

Course Name: Art of Poetry

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

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 aesthetic sense

CO4: Develop 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 ode less travelled: 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:26HS02PR0102-14

Course Name: Creative and Content Writing

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

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:26HS02PR0102-15

Course Name: Science of life through Bhagwad Gita

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

Course Objective

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

Course Outcome

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

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

CO3: Use meditation and breathing techniques for 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:26HS02PR0102-16

Course Name: Sanskrit Sambhashan- Spoken Sanskrit

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

Course objectives:

The objective of the course is to enhance the communication skills of the students in Sanskrit

Course outcome

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

CO1: Enhanced writing skills in Sanskrit

CO2: Enhanced speaking skills in Sanskrit

CO3: Enhanced listening skills in Sanskrit

CO4: Enhanced writing skills in Sanskrit

Syllabus:

संस्कृतसम्भाषणशिविरस्य पाठ्यक्रमः

प्रथमं दिनम्

- ❖ गीतम् - पठत संस्कृतम्..... ।
- ❖ मम नाम -भवतः नाम किम्? भवत्याः नाम किम्?
द्वयोः मध्ये परिचयः । परस्परं 5 जनान् ।
- ❖ सः कः? सा का? तत् किम्?
- ❖ एषः, एषा, एतत् ।
- ❖ अहम्, भवान्, भवती..... अभिनयः ।
- ❖ आम्, न, वा/किम्..... अभिनयः ।
- ❖ अस्ति x नास्ति..... अभिनयः ।
- ❖ अत्र, तत्र, कुत्र, सर्वत्र, अन्यत्र, एकत्र - अभिनयः ।
- ❖ षष्ठी - तस्य, एतस्य, कस्य, तस्याः, एतस्याः, कस्याः, मम, भवतः, भवत्याः..... अभिनयः ।
मम नासिका, भवतः नासिका, भवत्याः नासिका ।
एतत् कस्य? अङ्गानि प्रदर्श्य प्रश्नः ।
- ❖ दशरथस्य...., सीतायाः...., लेखन्याः...., पुस्तकस्य...., ।
स्फोरकपत्रस्य (Flash Card) उपयोगः करणीयः ।
'पुत्रः' 'पतिः' इत्यादीनां वाक्यपत्राणाम् (Charts)
उपयोगः करणीयः ।
- ❖ गीतम् - मनसा सततं स्मरणीयम् ।
- ❖ आवश्यकम्, मास्तु, पर्याप्तम्, धन्यवादः, स्वागतम् ।
- ❖ पूर्वनिश्चितसम्भाषणप्रदर्शनम् ।
- ❖ क्रियापदानां पाठनम् -
गच्छति । आगच्छति । पठति । लिखति । खादति । पिबति ।
क्रीडति । वदति । उत्तिष्ठति । उपविशति ।
- ❖ गच्छामि । आगच्छामि..... ।
- ❖ गच्छतु । आगच्छतु..... ।
- ❖ सङ्ख्याः - (अ) 1, 2, 3, 4.....10 ।
(आ) 10, 20, 30.....100 ।
- ❖ समयः - 5.00, 5.15, 5.30, 4.45 ।
- ❖ कथा - गतानुगतिको लोकः । (काचित् कथा सरलया भाषया वक्तव्या) ।
- ❖ रटनाभ्यासः (पूर्वमेव लिखितानि पठितानि च कानिचित् वाक्यानि वाचनीयानि) ।
- ❖ एकं वाक्यम् (प्रत्येक छात्रः एकं वाक्यं वदेत् ।)
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

द्वितीयं दिनम्

- ❖ गीतम् ।
- ❖ पुनस्स्मरणम् ।
- ❖ शब्देषु लिङ्गभेदज्ञापनम् - यथा -सः सुधाखण्डः, सा कुञ्चिका, तत् पुष्पम् ।
- ❖ बहुवचनपाठनम् -
बालकाः...., बालिकाः...., लेखन्यः...., पुस्तकानि.... ।
- ❖ ते, के, ताः, काः, तानि, कानि, एते, एताः, एतानि,
भवन्तः, भवत्यः, वयम् । (चित्राणि उपयोक्तव्यानि ।)
- ❖ वचनपरिवर्तनाभ्यासः । यथा - सः बालकः - ते बालकाः ।
अस्ति - सन्ति ।
- ❖ कति?
- ❖ सप्तमी - हस्ते । उत्पीठिकायाम् । लेखन्याम् । पुस्तके ।
(स्फोरकपत्रस्य प्रयोगः करणीयः ।)
वाक्यपत्रस्य उपयोगेन वाक्यानि वाचनीयानि ।
- ❖ कदा?
- ❖ उत्तराणां प्रश्नाः । (शिक्षकः आरम्भे उत्तरं वदेत्, अनन्तरं छात्राः तस्य प्रश्नं पृच्छेयुः ।)
यथा - रामः प्रातःकाले शालां गच्छति ।
रामः कदा शालां गच्छति?
- ❖ अद्य, श्वः, परश्वः, प्रपरश्वः, ह्यः, परह्यः, प्रपरह्यः, इदानीम् ।
- ❖ गीतम् ।
- ❖ गच्छन्ति । गच्छामः । गच्छन्तु ।
- ❖ शिष्टाचारः - सुप्रभातम्/नमस्कारः/शुभरात्रिः/हरिः
ओम्/क्षम्यताम्/चिन्ता मास्तु ।
- ❖ प्रातर्विधिः - दन्तधावनम् इत्यादयः शब्दाः पाठनीयाः ।
- ❖ सङ्ख्या - 1-50 ।
- ❖ समयः - 6.05, 6.10, 5.55, 5.50
- ❖ स्वागतसम्भाषणम् । (शिक्षकः सहशिक्षकेण सह कृत्वा प्रदर्शयेत्)
- ❖ कथा ।
- ❖ रटनाभ्यासः ।
- ❖ वाक्यद्वयम् (प्रत्येकम् अपि छात्रः वाक्यद्वयं वदेत् ।)
- ❖ सूचनाः ।
- ❖ ऐक्यमन्त्रः ।

तृतीयं दिनम्

- ❖ गीतम् ।
- ❖ पुनस्स्मरणम् ।
- ❖ क्रियापदानां बहुवचनरूपाणि ।
गच्छन्ति - गच्छामः - गच्छन्तु (Chart दर्शनीयम्)
पिबन्ति - पिबामः - पिबन्तु ।
लिखन्ति - लिखामः - लिखन्तु ।
इत्यादिपरिवर्तनाभ्यासः करणीयः ।
- ❖ द्वितीयाविभक्तिः - स्फोरकपत्राणाम् उपयोगः ।
(वाक्यपत्राणि उपयुज्य वाक्यानि वाचनीयानि ।)
- ❖ कृपया ददातु - वस्तूनि प्रदर्श्य ।
शिक्षकः एकैकं वस्तु प्रदर्शयति ।
उदा. - ग्रन्थः, घटी,.....
छात्राः - कृपया ग्रन्थं ददातु, कृपया घटीं ददातु इत्यादि
वदेयुः । (स्फोरकपत्रस्य उपयोगः)
- ❖ पुरतः, पृष्ठतः, वामतः, दक्षिणतः, उपरि, अधः ।
(चित्रं दर्शनीयम्)
- ❖ इतः, ततः,तः, गृहतः, कुतः?
(स्फोरकपत्राणाम् उपयोगः)
वाक्यपत्राणि उपयुज्य वाक्यानि वाचनीयानि ।
- ❖ गीतम् ।
- ❖ कथम्? सम्यक् ।
- ❖ शीघ्रम् × मन्दम् । उच्चैः × शनैः ।
- ❖ पठनार्थम्, किमर्थम्?
- ❖ सप्तककाराः - किम्, कुत्र, कति, कदा, कुतः, कथम्,
किमर्थम् (Chart प्रदर्शनीयम्) ।
एकैकम् उपयुज्य परस्परं प्रश्नाः ।
- ❖ अपि ।
- ❖ अस्तु ।
- ❖ अहं न जानामि । - कानिचन वाक्यानि ।
- ❖ भूतकालीनक्रियापदानां पाठनम् ।
गतवान् - पठितवान् - लिखितवान् ।
गतवती - पठितवती - लिखितवती ।
- ❖ क्रियापदकोष्ठकस्य प्रथमपृष्ठस्य अभ्यासः ।
- ❖ द्वितीयपृष्ठस्य सर्वाणि क्रियापदानि उपयुज्य छात्राः
वर्तमानकाले वाक्यानि वदन्ति । (ए.व - ब.व.)
- ❖ विशिष्टक्रियापदानाम् अभ्यासः -
करोमि - कुर्मः । करोति - कुर्वन्ति ।
ददामि - दद्युः । ददाति - ददति ।

शृणोमि - शृणुमः । शृणोति - शृण्वन्ति ।

जानामि - जानीमः । जानाति - जानन्ति ।

- ❖ सम्बोधनम् - भोः !, श्रीमन् !, मान्ये !, भगिनि!, मित्र !,
.....महोदय!, राम !, सीते ! इत्यादि ।
- ❖ सङ्ख्या- 1-100 ।
- ❖ समयः - 1.00, 2.00, 3.00, 4.00 ।
- ❖ सम्भाषणप्रदर्शनम् (मित्रसंलापः) ।
- ❖ कथा ।
- ❖ वाक्यत्रयम् एकैकोऽपि छात्रः वदेत् ।
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

चतुर्थ दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ च
- ❖ अतः
- ❖ एव
- ❖ इति
- ❖ अस्मि
- ❖ यदि -तर्हि
- ❖ यथा - तथा
- ❖ तः - पर्यन्तम् (वाक्यपत्रस्य उपयोगेन वाक्यानि
वाचनीयानि ।)
- ❖ अद्य आरभ्य
- ❖ कृते (वाक्यपत्रस्य उपयोगः करणीयः)
- ❖ क्तवतुप्रत्ययान्तानाम् अभ्यासः
गतवान् - पठितवान् - लिखितवान् (ए.व. पुलिङ्गे) ।
गतवती - पठितवती - लिखितवती (ए.व. स्त्रीलिङ्गे) ।
गतवन्तः - पठितवन्तः - लिखितवन्तः (ब.व. पुलिङ्गे) ।
गतवत्यः - पठितवत्यः - लिखितवत्यः (ब.व. स्त्रीलिङ्गे) ।
- ❖ सः गतवान् - सा गतवती - लिङ्गपरिवर्तनाभ्यासः ।
- ❖ अहं गतवान् - अहं गतवती - लिङ्गपरिवर्तनाभ्यासः ।
- ❖ क्रियापदानां कालपरिवर्तनाभ्यासः ।
यथा - गच्छति - गतवान्, गतवती ।
- ❖ गीतम् ।
- ❖ विशेषपाठनम् - आसीत्, आसन्, आसम् ।
- ❖ एकः, एका, एकम् - लिङ्गभेदः ज्ञापनीयः ।
(स्फोरकपत्रस्य उपयोगः)

- ♦ भोजनसम्बन्धिशब्दाः यथा - सूपः, शाकम्, इत्यदयः ।
- ♦ सङ्ख्या ।
- ♦ समयः ।
- ♦ ॐ - सङ्ख्याक्रीडा ।
- ♦ कथा ।
- ♦ सम्भाषणप्रदर्शनम् ।
- ♦ चत्वारि वाक्यानि ।
- ♦ सूचना ।
- ♦ ऐक्यमयः ।

पञ्चमं दिनम्

- ♦ गीतम् ।
- ♦ पुनःस्मरणम् ।
- ♦ वाहनानां नामानि ।
- ♦ तृतीयाविभक्तिः - दण्डेन, मापिकया, लेखन्या, पुष्पेण ।
(वाक्यपत्रस्य आधारेण वाक्यानि वाचनीयानि ।)
- ♦ सह, विना ।
- ♦ अद्यतन, ह्यस्तन, धस्तन, पूर्वतन, इदानीन्तन ।
- ♦ भविष्यत्कालीनक्रियापदानां पाठनम् ।
गमिष्यति, पठिष्यति, लेखिष्यति । (कोष्ठकस्य साहाय्येन)
- ♦ गत, आगमि ।
- ♦ गीतम् ।
- ♦ स्म ।
- ♦ अभवत् ।
- ♦ क्वाप्रयोगः (कोष्ठकस्य साहाय्येन) ।
- ♦ यदा - तदा ।
- ♦ बन्धुवाचकशब्दाः ।
- ♦ वेशभूषणानां नामानि ।
- ♦ वर्णाः ।
- ♦ रुचयः ।
- ♦ क्रीडा - एकव्यक्तेन सङ्ख्याकथनम् ।
- ♦ कथा ।
- ♦ पञ्च वाक्यानि ।
- ♦ सूचना ।
- ♦ ऐक्यमयः ।

षष्ठं दिनम्

- ♦ गीतम् ।
- ♦ पुनःस्मरणम् ।
- ♦ नूतनम् x पुरातनम्,

- ♦ बहु x किञ्चित्,
- ♦ दीर्घः x ह्रस्वः ।
- ♦ उन्नतः x वामनः ।
- ♦ स्थूलः x कृशः ।
- ♦ एतादृश, तादृश, कीदृश?
- ♦ तुमुन् (कोष्ठकस्य साहाय्येन) ।
- ♦ किन्तु ।
- ♦ निश्चयेन ।
- ♦ बहुशः / प्रायशः ।
- ♦ किल / खलु ।
- ♦ शक्नोति ।
- ♦ गीतम् ।
- ♦ विशेषणविशेष्यभावस्य अभ्यासः । (प्रथमाविभक्तौ)
सः उत्तमः बालकः ।
सा उत्तमा बालिका ।
तत् उत्तमं पुस्तकम् ।
- ♦ इव । विनोदकणिका । (गतवान् 'इव' अभिनये कृतवान्!)
- ♦ अपेक्षया ।
- ♦ पशूनां नामानि ।
- ♦ अवयवानां नामानि ।
- ♦ वाक्यविस्तारणाभ्यासः ।
(सः समं पुस्तकं प्रातःकाले पञ्चवादने पठितवान् ।)
- ♦ इतः पूर्वम् - इतः परम् ।
- ♦ 'रामकृष्ण' सङ्ख्याक्रीडा ।
- ♦ कथा ।
- ♦ षट् वाक्यानि ।
- ♦ सूचना ।
- ♦ ऐक्यमयः ।

सप्तमं दिनम्

- ♦ गीतम् ।
- ♦ पुनःस्मरणम् ।
- ♦ क्वा - तुमुन् - परिवर्तनाभ्यासः ।
- ♦ बहिः x अन्तः ।
- ♦ रिक्तम् x पूर्णम् ।
- ♦ इतोऽपि ।
- ♦ इत्युक्ते ।
- ♦ अन्ते ।
- ♦ चेत् - नो चेत् ।

- ❖ गीतम् ।
- ❖ आरोग्यसम्बन्धिशब्दाः – वैद्यरोगिसम्भाषणम् ।
- ❖ प्रश्नोत्तरस्पर्धा ।
- ❖ ऋषीणां नामानि ।
- ❖ कथा - शिक्षकः एकां कथां वदति । अनन्तरं छात्रेषु एकैकः तस्याः कथायाः एकैकं वाक्यम् उत्तवा कथां सम्पूर्णां करोति ।
- ❖ सङ्ख्या - दीर्घसङ्ख्यापाठनम् ।
- ❖ प्रश्नोत्तरम् ।
- ❖ क्रीडा - (गणद्वये नामस्मरणक्रीडा)
- ❖ कथा ।
- ❖ पुस्तकानां परिचयः ।
- ❖ सप्त वाक्यानि ।
- ❖ सूचना ।
- ❖ ऐक्यमन्त्रः ।

अष्टमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ वारम् ।
- ❖ अतः - यतः परिवर्तनाभ्यासः ।
- ❖ यद्यपि – तथापि ।
- ❖ यत्र – तत्र ।
- ❖ कति - कियत् - एतयोः भेदज्ञापनम् ।
- ❖ यावत् – तावत् ।
- ❖ यत् – तत् ।
- ❖ यः - सः ।
- ❖ या – सा ।
- ❖ गीतम् ।
- ❖ अस्माकम् ।
- ❖ चर्चा ।
- ❖ सङ्ख्या - 'शतायुः - गतायुः' क्रीडा ।
- ❖ विनोदकणिकाकथनम् ।
- ❖ कथा ।
- ❖ अष्ट वाक्यानि ।
- ❖ समाजनिधिविषये सूचना ।
- ❖ ऐक्यमन्त्रः ।

नवमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ चित् ।
- ❖द्वयम् ।
- ❖ सङ्ख्यासु लिङ्गभेदः ।
एकः - एका - एकम्
द्वयम् - द्वयम् - द्वयम्
त्रयः - तिस्रः - त्रीणि
चत्वारः - चतस्रः - चत्वारि
- ❖ शिश्रुकः - अहं वैद्यः - मम नाम सुरेशः
(छात्राः तमुद्दिश्य प्रश्नान् पृच्छेयुः ।)
- ❖ अर्थम् (समाजार्थम्, संस्कृतकार्यार्थम्...) ।
- ❖ गीतम् ।
- ❖ तव्यत् – अनीयम् ।
- ❖ अनन्त्यकथारचना ।
- ❖ सङ्ख्यान्वेषणम् (क्रीडा) ।
- ❖ छात्रैः सह प्रश्नोत्तरम् ।
- ❖ समाजनिधिविषये पुनःस्मरणम् ।
- ❖ ऐक्यमन्त्रः ।

दशमं दिनम्

- ❖ गीतम् ।
- ❖ पुनःस्मरणम् ।
- ❖ पत्रलेखनम् ।
- ❖ दूरवाणीसम्भाषणम् ।
- ❖ मार्गनिर्देशः – कुत्र गन्तव्यम् इत्यादि ।
- ❖ तव्यत् अभ्यासार्थम् – अद्य किं किं करणीयम् ?
- ❖ सान्दर्भिकभाषणम् –
1. प्रवासात् प्रतिनिवर्तनस्य ।
2. आपणिकस्य इत्यादि ।
- ❖ क्रीडा – सङ्ख्यायोजनम् (गणद्वये) ।
- ❖ शुभाशयाः ।
- ❖ असत्यकथनम् / कल्पनाकथनम् ।
- ❖ समारोपः (सर्वैः शिक्षार्थिभिः भारतमातुः पूजां कृत्वा निधिसमर्पणं करणीयम् ।)
- ❖ पत्राचारप्रगतशिक्षणादिविषये सूचना ।
- ❖ ऐक्यमन्त्रः ।

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

Course Code:26HS02PR0102-17

Course Name: Kirtan Kala

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

Course objectives:

The objective of the course is to provide the students with a spiritual experience as well as its benefits to them in the form of better abilities to concentrate and develop the ability to create a peaceful mind.

Course outcome

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

CO1: Learn from the inspiring spiritual journey of the saints and the history of Kirtan tradition

CO2: Learn about the musical instruments used in the art of Kirtan

CO3: Develop communication skills

- कीर्तन परंपरेचा इतिहास आणि अखिल भारतातील कीर्तन परंपरांचा परिचय
- चार महिन्यात वीस संतचरित्रांचा परिचय अधिक त्याविषयी प्रवचन
- वीस संतांचा वाङ्मयीन परिचय
- प्रमुख पाच कीर्तन पद्धतींचे मांडणी तंत्र.
- पूर्वरंग - उत्तररंग सहित कीर्तनप्रक्रियेतील सर्व महत्वाचे टप्पे.
- कीर्तनासाठी आवश्यक असणारी कंठ संगीतात्मक माहिती
- ठळ, मृदंग, वीणा, तबला, पेटी या वाद्यांची ओळख.
- प्रवचनांसाठी अभ्यासग्रंथांचे मार्गदर्शन.
- वक्तृत्व कला, संभाषण कला, संवाद कौशल्य, कथाकथन यांची रहस्ये
- कीर्तनाचे अनुषंगाने संस्कृत मराठी श्लोक, सुभाषिते व प्रमाणाधार अशी ओव्या अभंगांची शिंदोरी.

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

Course Code:26HS02PR0102-18

Course Name: Introduction to German Language and Culture

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

Course objective:

To help build a foundation and interest in German language 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 Germany, the culture and similarities/differences between India and Germany

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

CO3. Develop ability to write in basic German about themselves and others.

CO4. Develop ability to read and understand beginner level texts in German.

Syllabus

List of Practicals

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

Practical-2: Vocabulary building for everyday conversations

Practical -3: Numbers, days and time

Practical-4: Introducing Oneself & Others

Practical-5: Reading Skills: Reading simple text in German language

Practical-6: Basic Verbs & Sentence Construction

Practical-7: Food & Dining, Giving Directions & Transportation

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

Recommended reading

1. German Made Easy by Diego A. Agundez
2. Teach Yourself Complete German: Learn to Read, write, Speak and Understand A new Language by Paul Coggle, Heiner Schenke
3. Netzwerk A1 by Helen Smitz, Stefanie Dengler and Paul Rusch
4. Deutsche Welle (DW) – www.dw.com/learngerman
5. BBC Languages – German – www.bbc.co.uk/languages/german
6. Goethe-Institut – www.goethe.de

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

Course Code: 26HS02PR0102-24

Course Name: Audio Recording & Dubbing

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

Course delivery: VMV Commerce, JMT Arts & JJP Science, B.Voc. Department

Course Outcomes:

CO1: Develop a Comprehensive Understanding of Audio in Content Creation

CO2: Equip students with in-depth knowledge of the role, benefits, and applications of audio in enhancing digital content across various platforms.

CO3: Design and Implement a Personalized Audio Setup. Enable students to build and optimize their own audio recording setups tailored for platforms such as YouTube, Instagram, podcasts, and other digital media outlets.

CO4: Enhance Presentation and Marketing Skills Through Audio Integration.

Demonstrate how high-quality audio contributes to effective communication, audience engagement, and brand marketing in both professional presentations and promotional content.

Syllabus:

Practical 1: Orientation in Sound and Basics of Audio

Practical 2: Orientation in Input and Output

Practical 3: Orientation in Audio Devices (Hardware & Software)

Practical 4: Audio Recording: Song, Voiceover, Dubbing

Practical 5: Audio Editing

Practical 6: Audio Session I

Practical 7: Audio Session II

Practical 8: Audio Session III

References books

1. Sound and Recording: Applications and Theory – Francis Rumsey & Tim McCormick (Focal Press)
2. Practical Recording Techniques – Bruce Bartlett & Jenny Bartlett (Routledge)
3. Mixing Audio: Concepts, Practices and Tools – Roey Izhaki (Focal Press)
4. The Art of Sound Recording – David Moulton
5. Digital Audio Editing: Correcting and Enhancing Audio – Simon Langford (Focal Press)
6. Mixing Secrets for the Small Studio – Mike Senior (Focal Press)
7. The Mixing Engineer's Handbook – Bobby Owsinski (Hal Leonard)
8. Audio Engineering 101 – Tim Dittmar (Focal Press)

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

Course Code: 26HS02PR0102-25

Course Name: Art of Basic Film Making

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

Course delivery: VMV Commerce, JMT Arts & JJP Science, B.Voc. Department

Course Objectives:

The course aims to introduce students to the fundamentals of filmmaking, nurturing creativity and technical understanding through hands-on practical sessions. Students will learn the visual language of cinema and explore storytelling through the medium of film.

Course Outcomes (COs)

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

CO1: Understand the basic concepts, history, and evolution of film as an art form.

CO2: Apply principles of visual storytelling, framing, and composition in short film projects.

CO3: Develop creative and technical skills related to camera handling, lighting, sound, and editing. CO4: Work collaboratively to conceptualize, plan, shoot, and edit a short film, demonstrating teamwork, creativity, and problem-solving skills.

Syllabus:

- Practical 1 Introduction and Orientation to Film Making
- Practical 2 Basics of Visual Storytelling and Cinematic Language
- Practical 3 Camera Handling and Shot Composition
- Practical 4 Lighting and Sound Techniques
- Practical 5 Scripting and Storyboarding
- Practical 6 Shooting Exercises and On-Set Practice
- Practical 7 Basics of Editing and Post-Production
- Practical 8 Final Short Film Project and Screening

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

Course Code : 26HS02TH0103-2

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

Unit1:-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) P L Dhar, R R 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 : 26HS05TP0201

Course Name: Applied Physics

L :2 Hrs., T: 0 hr P :2 Hrs., Per Week 3

Credits: 3

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

1. Analyze Oscillatory Systems and Structural Stability.
2. Apply reverberation theory and sound absorption principles to design interior spaces that meet specific acoustic standards.
3. Utilize Laser technology and Fiber Optic Sensors for high-precision surveying and real-time monitoring of civil infrastructure.
4. Evaluate the microscopic and thermal properties of construction materials using advanced characterization tools
5. Demonstrate proficiency in precision measurement and statistical modeling to determine the physical constants of engineering materials.

Module 1: Oscillations

6 L

Forces in Nature, fundamental and derived forces; Newton's Laws of Motion, 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; zones of earthquakes, seismograph, structural stability during earthquakes.

Module 2: Architectural Acoustics

7L

Fundamentals of vibrations, Sound waves and their 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. Thermal conductivity methods and materials.

Module 3: Laser and Sensors

7L

Interaction of matter and radiation, spontaneous and stimulated emission, metastable state, population inversion, Pumping Methods; three level and four level laser, Components of Laser, Modes of the Laser Beam, Types of laser: Ruby laser, He-Neon laser, Nd:YAG laser, Laser Beam Characteristics , Applications of laser in 3D Laser Survey in Construction, Surveying and highways engineering

Sensors: Stress, Strain and Temperature Sensors, Applications of Fibre Optic Sensors in Crack Monitoring, Cable and FRP Monitoring, Bridge Monitoring, Moisture Monitoring

Module 4: Characterization Techniques

8L

X-ray Diffraction (XRD), Elements of electron microscopy; Scanning Electron Microscope (SEM), Transmission Electron Microscope (TEM) Atomic force microscope (AFM), Thermal Gravimetric Analysis (TGA), Applications of nanomaterials in construction materials concrete, steel, coating, glass, insulating materials etc.

Text Books:

1. Engineering Physics by M.N. Avadhanulu and Kshirsagar S. Chand Publication
2. Engineering Physics by Sanjay Jain and Girish Sahasrabudhe , Universities Press

Reference Books:

1. The Physics of vibrations and waves by H.J. Pain Sixth edition , John wiley and Sons, Ltd.

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

Course Code: 26HS03TH0211

Course Name: Engineering Mathematics-II

L: 3Hrs., T: 0 Hrs., P: 0 Hrs., Per week

Total Credits: 03

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 be 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
 2. Evaluate definite and improper integrals using Beta, Gamma functions, and trace the 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. Interpret the geometrical meaning of gradient, curl and divergence.
 5. Perform line, surface and volume integrals of vector-valued functions.
-

Syllabus:

Module 1: Linear Algebra : (7 hours)

Rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Eigen values and eigenvectors; Cayley Hamilton theorem, Diagonalization of matrices; Orthogonal transformation and quadratic to canonical forms, Introduction to n-dimensional space, Singular value decomposition and its application in reducing the dimensionality of images and data .

Module 2: Integral Calculus: (7 hours)

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

Module 3: Multiple Integrals (8 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:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2000.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

References:

1. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. P. N. Wartikar and J. N. Wartikar, A text book of Applied Mathematics Volume I & II, Pune Vidhyarthi Griha Prakashan, Pune-411030 (India).

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

Course Code : 26ES01TP0201

Course Name: Basics of Surveying

L :3 Hrs., P : 2 Hrs., Per Week

Credits: 4

Course Outcomes: After successful completion of the course, the student will be able to;

CO1: **Explain** the fundamental principles, classifications, and methods of surveying, including compass surveying, and levelling concepts such as bearings, meridians, and contouring.

CO2: **Perform** linear and angular measurements using chain, tape, prismatic compass, and levelling instruments, and **record** observations systematically in standard field books.

CO3: **Analyze** field data to determine elevations, areas, and volumes using methods such as levelling (HI and Rise & Fall), contouring, coordinate methods, and cross-sections.

CO4: **Evaluate** errors in chaining, compass surveying, levelling, and theodolite measurements and **apply** appropriate corrections such as for slope, temperature, sag, curvature, refraction, and local attraction.

CO5: **Operate** theodolite for measurement of horizontal and vertical angles using repetition and reiteration methods and **analyze** traverse data with necessary checks and adjustments.

Syllabus

Introduction: Definition of surveying, primary divisions of surveying, object and classification of surveying, principles of surveying, approximate methods of chain and tape surveying, unfolding and folding of a chain, instruments for chaining and taping, measurement by tape and chain, errors in tape measurements and their corrections, testing and adjusting of a chain, chaining on flat and sloping ground, obstacle in chaining, direct and indirect methods of ranging, methods of traversing, principle basic definitions, bearings and meridians, prismatic compass, surveyors compass, azimuthal and quadrantal bearing systems, true north and magnetic north, magnetic declination, local attraction and its correction.

Levelling and contouring: Definition of terms, principles of levelling, types of levels, levelling staffs, booking and reduction in field book, balancing of sights, errors, curvature and refraction, distance of visible horizon, reciprocal levelling, and its merits, contour, contour interval, horizontal equivalent, contour gradient, factors affecting contour interval, characteristics of contours, direct and indirect methods of contouring, uses of contour maps.

Area: Measurement of Area, Computation of area by Geometrical Figure, Area of offsets, Area from co-ordinates, Area by planimeter, Digital Planimeter

Volume: Definitions, Methods of Measurement of Volume. Measurement from cross-sections, Types of cross-sections and areas, prismoidal correction, curvature corrections

Theodolite: Vernier and microscopic theodolite, construction, temporary and permanent adjustments, measurement of horizontal and vertical angles, methods of repetitions and reiteration, sources of errors, checks in traversing, omitted measurements.

Introduction to Modern Surveying Tools : Total Station, Global Positioning System (GPS), Overview of Electronic Distance Measurement (EDM), Drone surveying (UAV overview), LiDAR concept (introductory)

Text Book

1. Duggal S.K., *Surveying Volume-I*, Tata McGraw Hill Publisher, New Delhi, 2017.
2. Arora K.R., *Surveying Volume-I*, Standard Publishers Distributors, 2019.
3. Punmia, B.C., Jain A.K., Jain A.K., *Surveying Volume-I*, Laxmi Publications, 2016.

Reference Book

1. Kanetkar T.P., *Surveying and Levelling*, Pune Vidyarthi Griha Prakashan, Pune, 2006

Course Name: Basics of Surveying Lab

Course Outcomes: After successful completion of the course, the student will be able to;

CO1: **Perform** basic surveying operations such as measurement of bearings using compass and levelling using auto level, and **record** observations systematically in field books.

CO2: **Carry out** profile levelling, cross-section levelling, and plane table traversing, and **analyze** the collected data for preparation of field outputs.

CO3: **Measure and analyze** horizontal and vertical angles using vernier theodolite and **interpret** the results for traversing and alignment purposes.

CO4: **Operate** modern surveying instruments such as Total Station and **process** field data for traversing and coordinate determination.

CO5: Plan, execute, and present a field survey project (survey camp) involving contouring, road alignment, layouting, or boundary survey using appropriate advanced instruments.

Any Six

1. Measurement of fore and back bearing by compass
2. Measurement and booking of levels by auto level
3. Profile & cross section levelling
4. Measurement of Horizontal angle by mechanical vernierTheodoite
5. Measurement of Vertical angels by mechanical vernierTheodoite
6. Traversing by total station
7. To plot a contour map
8. Area computation using digital planimeter

Mini Project / Field Assignment

- Conduct a small survey (campus/local area)
- Prepare:
 - o Traverse map
 - o Contour map
 - o Area & volume report

Structured Survey Camp Deliverables

Students should submit:

- Field book (signed & verified)
- Calculations (levels, traverse, area)
- Final drawings (plan, contour, profile)
- Brief technical repor

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

Course Code : 26ES01TP0202

Course Name: Solid Mechanics

L :3 Hrs., P :2 Hrs., Per Week

Credits:4

Course Outcomes:

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

CO1: Explain stress–strain behaviour and elastic properties of engineering materials through theoretical and experimental approaches.

CO2: Apply the principles of stress transformation to determine principal stresses, principal strains, and maximum shear stresses in two-dimensional stress systems.

CO3: Analyse statically determinate beams to determine shear force, and bending moment, and construct Shear Force Diagrams (SFD) and Bending Moment Diagrams (BMD).

CO4: Apply bending, shear, and torsion theories to evaluate stresses in beams and circular shafts using analytical and experimental methods.

CO5: Analyse slope and deflection of beams and evaluate the buckling behaviour of columns under different end conditions using classical methods and laboratory observations.

Theory Syllabus:

Unit 1 Simple Stress & Strain – (8 Hours)

Stress & strain basics- Stress–strain curves- Hooke’s law- Elastic constants- Axial loading - Composite bars- Temperature stresses- Statically indeterminate members

Unit 2 Principal Stress & Strain – (6 Hours)

Stress transformation- Principal stresses & strains- Maximum shear stress- Combined loading

Unit 3 Shear Force & Bending Moment (8 Hours)

Types of loads & supports- Axial force, S.F., B.M.- SFD & BMD for point load, UDL, UVL

Unit 4 Bending, Shear & Torsion (8 Hours)

Bending theory- Bending stress- Shear stress in beams- Torsion of circular shafts- Torsional rigidity-

Unit 5 Slope, Deflection & Buckling – (6 Hours)

Slope & deflection- Double integration method- Euler’s buckling theory- Effective length & end conditions.

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.

Reference Books:

1. Seely, F. B.; and Smith, J.O "Advanced Mechanics of Material", John Wiley and Sons. Inc.
2. Beer &Johntson, Mechanics of Materials: , McGraw - Hill Publishers.
3. Strength of Materials: S.Ramamrutham, Dhanpat Rai and Sons, New Delhi
4. Strength of Materials: S.S.Rattan McGraw Hill Education India Pvt Limited, 2008

Solid Mechanics Laboratory

Minimum Eight Practicals to be Performed from the Following:

- 1. Study of Elastic Properties of Metals**

Determination of Young's modulus, modulus of rigidity, and Poisson's ratio.

- 2. Tension Test on Mild Steel Specimen**

Determination of yield stress, ultimate stress, percentage elongation, and stress–strain curve.

- 3. Compression Test on Metals**

Study of compressive behaviour and failure pattern of materials.

- 4. Shear Test on Metals:**

Determination of shear strength of metallic specimens.

- 5. Verification of Shear Force Diagram (SFD) and Bending Moment Diagram (BMD)**

Graphical and experimental verification for beams subjected to point load and UDL.

- 6. Impact Test on Metals:**

Determination of impact strength/toughness of metals using Charpy or Izod impact testing machine.

- 7. Torsion Test on Circular Shafts:**

Determination of modulus of rigidity and torsional behaviour of shafts.

- 8. Deflection Test on Beams**

Measurement of slope and deflection in statically determinate beams under different loading conditions.

- 9. Bending Test on Beam**

Verification of bending theory and determination of bending stresses.

- 10. Buckling Test on Columns/Struts:**

Study of buckling behaviour under different end conditions and comparison with Euler's buckling load.

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

Course Code : 26ES01TH0203

Course Name: Building Services

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

Credits: 3

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 Students will be able to evaluate the fire fighting system of a building.
4. The Students will be able to understand basics of electrification in a building.
5. 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 Decentralized 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 :26HS02TH0205

Course Name: Foundation Literature of Indian Civilization

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

Courseoutcome:

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

Unit 1: Overview of Indian Knowledge System: 6 hours

Importance of ancient knowledge, defining IKS, IKS classification framework, Historicity of IKS, Some unique aspects of IKS.

Unit 2: The Vedic corpus: 6 hours

Introduction of Vedas, four Vedas, divisions of four Vedas, six Vedangas, Distinct features of Vedic life.

Unit 3: Indian Philosophical systems: 6 hours

Development and unique features, Vedic schools of philosophy, Samkhya and Yoga School of philosophy, Nayay and Vaisesika school of philosophy, Purva-mimamsa and Vedanta schools of Philosophy, Non-vedic philosophies: Jainism, Buddhism, and other approaches

Unit 4: Indian wisdom through ages: 8 hours

Panchtantras, 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: 26HS04PR0201

Course Name: Health-Fitness Wellbeing (HFW)

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

Credits: 1

Aim of the Course: The course aims to foster Health and wellness through Healthy and Active Lifestyle and creating awareness about the fundamentals of Physical Education, Sports, Yoga, Recreation and its effectiveness through practical experiences and hands on activities.

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 Health, Fitness, Sports and Yoga.
2. Practically learn the principles of implementing general and specific conditioning of Fitness exercises.
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 Life style.

Course Content:

Unit 1:

- Warm up and Cool Down and Stretching Exercises.
- General and Specific Exercises.
- Calculation of BMI & Resting Pulse Rate.
- General and Specific exercises for strength, Speed, Agility, Cardiovascular Endurance, Flexibility and Coordination.
- Practice of Fundamental Skills of Volleyball, Table Tennis and Chess, etc.
- Knowledge and practice of the Equipment used in Health Center, Gymnasium and its application.

Unit 2:

- Yog: Standing, Sitting, Prone & Supine positions.
- Suryanamaskar.
- Pranayama, Meditation and Relaxation Techniques.
- Dietary Habits, Daily Energy Requirements

- Recreational Games.
- Practice of Fundamental Skills of Basketball, Football, Carrom, etc.
- Health related Physical Fitness Test.

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 RestonVirginia
4. Kumar, Ajith. (1984) Yoga Pravesha. Bengaluru: Rashthrothanna Prakashana.
5. Dr. Devinder K. Kansal, A Textbook of Test Evaluation, Accreditation, Measurements and Standards(TEAMS 'Science)