



Jai Mahakali Shikshan Sanstha's

# Shri Shankarprasad Agnihotri College of Engineering



Approved by AICTE, New Delhi (06/07/MS Engg. 2005 Dated 18/06/2007)  
DTE Mumbai Recognised by Govt of Maharashtra Affiliated to R.T.M. Nagpur University, Nagpur

Pt. Shri. Shankarprasad Agnihotri  
President

Dr. C. B. Kothare (M.E. Ph.D)  
Principal

Ref.

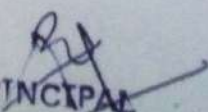
Date :

1.1.1: The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

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PRINCIPAL  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

# RTM Nagpur University Scheme of Examination

## Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur Four Years B.E. Course

Scheme of Examination B.E. First year ( All Branches of Engineering)

### First Semester

Sub Code	Subjects	Workload in hrs			Credits	Marks					Minimum Passing Marks	
		L	T/A	P		Theory		Practical		Total	Theory	Practical
						Internal	Uni	Internal	Uni			
BSE1-1T	Mathematics-I	3	1	-	4	30	70	-	-	100	45	-
BSE1-2T	Applied Physics	3	2	-	4	30	70	-	-	100	45	-
BSE1-3T	Energy and Environment	2	2	-	3	30	70	-	-	100	45	-
BSE1-4T	Communication Skills	2	-	-	2	15	35	-	-	50	23	-
BSE1-5T	Engineering Graphics	1	-	-	1	15	35	-	-	50	23	-
BSE1-6T	Basics of Civil & Mechanical Engineering	4			Audit	50	-	-		Audit	-	-
BSE1-2P	Applied Physics Lab	-	-	3	1.5			25	25	50	-	25
BSE1-3P	Energy and Environment Lab	-	-	2	1			25	25	50	-	25
BSE1-4P	Communication Skills Lab	-	-	2	1			25	25	50	-	25
BSE1-5P	Engineering Graphics Lab	-	-	4	2			25	25	50	-	25
Three weeks Induction Program												
<b>Total</b>		<b>15</b>	<b>11</b>		<b>19.5</b>	<b>120*</b>	<b>280</b>	<b>100</b>	<b>100</b>	<b>600</b>		

- L- Lecture , P-Practical, T- Tutorial , A- Activity (Half Credit per Hour)

### Scheme of Examination B.E. First year ( All Branches of Engineering)

### Second Semester

Sub Code	Subjects	Workload in hrs			Credits	Marks					Minimum Passing Marks	
		L	T/A	P		Theory		Practical		Total	Theory	Practical
						Internal	Uni	Internal	Uni			
BSE2-1T	Mathematics-II	3	1	-	4	30	70	-	-	100	45	-
BSE2-2T	Advanced Engineering Materials	2	2	-	3	30	70	-	-	100	45	-
BSE2-3T	Applied Chemistry	3	2	-	4	30	70	-	-	100	45	-
BSE2-4T	Computational Skills	2	-	-	2	15	35	-	-	50	23	-
BSE2-6T	Basics of Electrical Engineering	2	-	-	2	15	35	-	-	50	23	-
BSE2-7T	Engineering Mechanics	2	-	-	2	15	35	-	-	50	23	-
BSE2-8T	Indian Culture & Constitution	2	-	-	Audit	50	-	-	-	Audit	-	-
BSE1-5P	Workshop Practices	-	-	4	2	-	-	50	50	100	-	50
BSE2-2P	Advanced Engineering Materials	-	-	2	1	-	-	25	25	50	-	25
BSE2-3P	Applied Chemistry			3	1.5	-	-	25	25	50	-	25
BSE2-4P	Computational Skills			2	1	-	-	25	25	50	-	25
Three weeks Induction Program												
<b>Total</b>		<b>16</b>	<b>5</b>	<b>11</b>	<b>22.5</b>	<b>135*</b>	<b>315</b>	<b>125</b>	<b>125</b>	<b>700</b>		

- L- Lecture , P-Practical, T- Tutorial, A- Activity (Half Credit per Hour)

\* Audit course marks are not counted in total marks

#### Guidelines

- Energy and Environment shall be taught by faculty of Chemistry and will come under board of Applied Science and Humanities (only by Chemistry Dept)
- Advance Engineering Materials shall be taught by faculty of Physics and will come under board of Applied Science and Humanities (only by Physics Dept)

**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR  
FACULTY OF SCIENCE & TECHNOLOGY  
SCHEME OF EXAMINATION & EVALUATION  
B. TECH CIVIL ENGINEERING (CHOICE BASED CREDIT SYSTEM)  
SEMESTER: THIRD**

Sr. No	Subject Code	Subject	Workload in Hours			Credit				Marks					Minimum passing marks	
			L	T/A	P	L	T/A	P	Total	Theory		Practical		Total	Theory	Practical
										Int	Uni	Int	Uni			
1	BTCVE301T	Mathematics-III	3	1	0	3	1	0	4	30	70	--	--	100	45	--
2	BTCVE302T	Fluid Mechanics	3	0	0	3	0	0	3	30	70	--	--	100	45	--
3	BTCVE302P	Fluid Mechanics (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
4	BTCVE303T	Solid Mechanics	3	1	0	3	1	0	4	30	70	--	--	100	45	--
5	BTCVE303P	Solid Mechanics (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
6	BTCVE304T	Geotechnical Engineering	3	0	0	3	0	0	3	30	70	--	--	100	45	--
7	BTCVE304P	Geotechnical Engineering (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
8	BTCVE305T	Building Construction & Elementary Building Drawing	2	0	0	2	0	0	2	30	70	--	--	100	45	--
9	BTCVE305P	Building Construction & Elementary Building Drawing (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
10	BTCVE306T	Effective Technical Communication	2	0	0	2	0	0	2	15	35	--	--	50	23	--
<b>Total</b>			<b>16</b>	<b>2</b>	<b>8</b>	<b>16</b>	<b>2</b>	<b>4</b>	<b>22</b>	<b>165</b>	<b>385</b>	<b>100</b>	<b>100</b>	<b>750</b>		

• L- Lecture , P-Practical, T- Tutorial , A- Activity (Half Credit per Hour)

*(Signature)*  
C. S. Shinde

*(Signature)*  
(Dr. A. N. Dabhadre)  
BoS Member

*(Signature)*  
(Dr. Avinash N. Shrikhande,  
BoS (Civil Engg) chairman

**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**SCHEME OF EXAMINATION & EVALUATION**  
**B. TECH CIVIL ENGINEERING (CHOICE BASED CREDIT SYSTEM)**  
**SEMESTER: FOURTH**

Sr. No	Subject Code	Subject	Workload in Hours			Credit				Marks					Minimum passing marks	
			L	T/A	P	L	T	P	Total	Theory		Practical		Total	Theory	Practical
										Int	Uni	Int	Uni			
1	BTCVE401T	Concrete Technology	3	0	0	3	0	0	3	30	70	--	--	100	45	--
2	BTCVE402T	Structural Analysis	3	1	0	3	1	0	4	30	70	--	--	100	45	--
3	BTCVE402P	Structural Analysis (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
4	BTCVE403T	Environmental Engineering	3	0	0	3	0	0	3	30	70	--	--	100	45	--
5	BTCVE403P	Environmental Engineering(Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
6	BTCVE404T	Transportation Engineering	3	0	0	3	0	0	3	30	70	--	--	100	45	--
7	BTCVE404P	Transportation Engineering (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
8	BTCVE405T	Surveying & Geomatics	3	0	0	3	0	0	3	30	70	--	--	100	45	--
9	BTCVE405P	Surveying & Geomatics (Practical)	0	0	4	0	0	2	2	--	--	25	25	50	--	25
10	BTCVE406P	Mini Project (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
<b>TOTAL</b>			<b>15</b>	<b>1</b>	<b>12</b>	<b>15</b>	<b>1</b>	<b>6</b>	<b>22</b>	<b>150</b>	<b>350</b>	<b>125</b>	<b>125</b>	<b>750</b>		

• L- Lecture , P-Practical, T- Tutorial , A- Activity (Half Credit per Hour)

**Note: In Summer vacation after 4<sup>th</sup> Semester, students have to complete 2 to 3 weeks industrial / Government / NGO / MSME / Rural Internship / Innovation / Entrepreneurship training. In the beginning of 5<sup>th</sup> semester, students have to submit detailed report of summer vacation training to department.**

*Signature*  
*Chaitan G. Sonale*

*Signature*  
 (Dr. A.N. Dabhade)  
 BOS Member

*Signature*  
 (Dr. Avinash N Shrikhande,  
 BOS (Civil Engg) chairman

**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**SCHEME OF EXAMINATION & EVALUATION**  
**B. TECH CIVIL ENGINEERING (CHOICE BASED CREDIT SYSTEM)**  
**SEMESTER: FIFTH**

Sr. No	Subject Code	Subject	Workload in Hours			Credit				Marks					Minimum passing marks	
			L	T/A	P	L	T	P	Total	Theory		Practical		Total	Theory	Practical
										Int	Uni	Int	Uni			
1	BTCVE501T	Hydraulic Engineering	3	0	0	3	0	0	3	30	70	--	--	100	45	--
2	BTCVE501P	Hydraulic Engineering (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
3	BTCVE502T	Reinforced Cement Concrete (RCC) designs	3	1	0	3	1	0	4	30	70	--	--	100	45	--
4	BTCVE503T	Civil Engineering Materials, Testing & Evaluation	3	0	0	3	0	0	3	30	70	--	--	100	45	--
5	BTCVE503P	Civil Engineering Materials, Testing & Evaluation (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
6	BTCVE504T	Professional Practice, Law & Ethics	3	0	0	3	0	0	3	30	70	--	--	100	45	--
7	BTCVE505T	Elective-I	3	0	0	3	0	0	3	30	70	--	--	100	45	--
8	BTCVE506T	Elective-II	3	0	0	3	0	0	3	30	70	--	--	100	45	--
9	BTCVE507P	Industrial Training (Already done in summer vacation after 4 <sup>th</sup> sem) & Professional Skill Training (Software Applications in Civil Engineering)	0	0	2	0	0	1	1	--	--	50	50	100	--	50
10	BTCVE508AU	Organizational Behavior	2	0	0	0	0	0	0	--	--	50	Audit	50	--	--
<b>TOTAL</b>			<b>20</b>	<b>1</b>	<b>6</b>	<b>18</b>	<b>1</b>	<b>3</b>	<b>22</b>	<b>180</b>	<b>420</b>	<b>150</b>	<b>100</b>	<b>850</b>		

• L- Lecture , P-Practical, T- Tutorial , A- Activity (Half Credit per Hour)

*Dr. G. S. Bhat*  
*Dr. G. S. Bhat*

*Dr. A. N. Dabhadre*  
 (Dr. A. N. Dabhadre)  
 BOS Member

*Dr. Avinash N. Shrikhande*  
 (Dr. Avinash N. Shrikhande,  
 BOS (Civil Engg) chairman

**RASHTRASANT TUKDOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**  
**FACULTY OF SCIENCE & TECHNOLOGY**  
**SCHEME OF EXAMINATION & EVALUATION**  
**B. TECH CIVIL ENGINEERING (CHOICE BASED CREDIT SYSTEM)**  
**SEMESTER: SIXTH**

Sr. No	Subject Code	Subject	Workload in Hours			Credit				Marks					Minimum passing marks	
			L	T/A	P	L	T	P	Total	Theory		Practical		Total	Theory	Practical
										Int	Uni	Int	Uni			
1	BTCVE601T	Estimating & Costing	3	1	0	3	1	0	4	30	70	--	--	100	45	--
2	BTCVE601P	Estimating & Costing (Practical)	0	0	2	0	0	1	1	--	--	25	25	50	--	25
3	BTCVE602T	Construction Engineering & Management	2	1	0	2	1	0	3	30	70	--	--	100	45	--
4	BTCVE603T	Water Resource Engineering	3	0	0	3	0	0	3	30	70	--	--	100	45	--
5	BTCVE604T	Elective-III	3	0	0	3	0	0	3	30	70	--	--	100	45	--
6	BTCVE605T	Open Elective-I	3	0	0	3	0	0	3	30	70	--	--	100	45	--
7	BTCVE606P	Computer Aided Civil Engineering Drawing (Practical)	0	0	2	0	0	1	1	--	--	50	50	100	--	50
<b>TOTAL</b>			<b>14</b>	<b>2</b>	<b>4</b>	<b>14</b>	<b>2</b>	<b>2</b>	<b>18</b>	<b>150</b>	<b>350</b>	<b>75</b>	<b>75</b>	<b>650</b>	<b>--</b>	<b>--</b>

- L- Lecture , P-Practical, T- Tutorial , A- Activity (Half Credit per Hour)

**Note: In summer vacation after 6<sup>th</sup> Semester, student have to complete 3 to 4 weeks industrial / Government / NGO / MSME / Rural Internship / Innovation / Entrepreneurship training. In the beginning of 7<sup>th</sup> semester, student have to submit detailed report of summer vacation training to department.**

*(Signature)*  
 Charles G. Shinde

*(Signature)*  
 (Dr. A.N. Dashade)  
 BOS Member

*(Signature)*  
 (Dr. Avinash N Shrikhande,  
 BOS (Civil Engg) chairman

**Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur**  
**Faculty of Engineering & Technology**  
**CIVIL ENGINEERING**  
**Scheme of Examination & Evaluation - CBS**  
**Semester: Seventh**

Subject Code	Course	Teaching Scheme (Clock Hours/ Week)					Evaluation Scheme								Duration of University Theory Exam (Hrs)
		Theory hrs/week	Tutorial hrs/week	Practical hrs/week	Total hrs/week	Credits	Assessment of Marks for Theory				Assessment of Marks for Practical				
							College Assessment (CA)	University Exam	Total Marks	Min. Marks	Internal	External	Total Marks	Min. Marks	
BECVE701T	Advanced Concrete Structures	3	1		4	4	20	80	100	40					4
BECVE701P	Advanced Concrete Structures			2	2	1					25	25	50	25	
BECVE702T	Estimating and Costing	3	1		4	4	20	80	100	40					4
BECVE702P	Estimating and Costing			2	2	1					50	50	100	50	
BECVE703T	Elective -I	3	1		4	4	20	80	100	40					3
BECVE704T	Construction Management and Law	4			4	4	20	80	100	40					3
BECVE705T	Transportation Engineering - II	3	1		4	4	20	80	100	40					3
BECVE706P	Industrial Case Study and Project Seminar			3	3	3					50	50	100	50	
<b>Total</b>		<b>16</b>	<b>4</b>	<b>7</b>	<b>27</b>	<b>25</b>	<b>100</b>	<b>400</b>	<b>500</b>		<b>125</b>	<b>125</b>	<b>250</b>		

**Note:** 1. External Practical Evaluation of "Estimating & Costing" shall be performance based (Manual or using suitable Software) on assigned problem by the External Examiner  
2. Evaluation of Summer Training – 2 (ST-2) shall be done as Industrial Case Study Component & minimum two seminar should be delivered as continuous college assessment for project seminar component.

**Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur**  
**Faculty of Engineering & Technology**  
**CIVIL ENGINEERING**  
**Scheme of Examination & Evaluation - CBS**  
**Semester: Eighth**

Subject Code	Course	Teaching Scheme (Clock Hours/ Week )					Evaluation Scheme								Duration of University Theory Exam (Hrs)
		Theory hrs/week	Tutorial hrs/week	Practical hrs/week	Total hrs/week	Credits	Assessment of Marks for Theory				Assessment of Marks for Practical				
							College Assessment (CA)	University Exam	Total Marks	Min. Marks	Internal	External	Total Marks	Min. Marks	
BECVE801T	Irrigation Engineering	3	2		5	5	20	80	100	40					3
BECVE802T	Elective - II	3	1		4	4	20	80	100	40					3
BECVE803T	Elective - III	4			4	4	20	80	100	40					3
BECVE803P	Elective - III			2	2	1					25	25	50	25	
BECVE804T	Construction Economics and Finance	3	1		4	4	20	80	100	40					3
BECVE805P	Project			6	6	6					75	75	150	75	
<b>Total</b>		<b>13</b>	<b>4</b>	<b>8</b>	<b>25</b>	<b>24</b>	<b>80</b>	<b>320</b>	<b>400</b>		<b>100</b>	<b>100</b>	<b>200</b>		

**Note:** Internal Evaluation of Project shall be based on the academic contribution of a student and delivery of minimum one seminar on the project work.

**BECVE804T** - Construction Economics and Finance subject shall be dealt by Board of Basic Science and Humanities.



## Computer science & Engineering

**R.T. M. Nagpur University, Nagpur  
FOUR YEAR B.E. COURSE**

**B.E. SCHEME OF EXAMINATION wef: 2021-22**

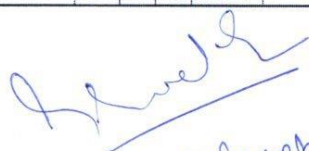
**Scheme of Teaching & Examination of Bachelor of Engineering III Semester B.E. (Computer Science and Engineering)**

Sr. No.	Course Code	Category	Course Name	Hours/Week			Credits	Maximum Marks				Total
				L	T	P		Theory		Practical		
								Internal	University	Internal	University	
1	BECSE301T	Basic Sciences courses	Applied Mathematics – III	3	1	-	4.00	30	70	-	-	100
2	BECSE302T	Professional core courses	Object Oriented Programming with Java	3	1	-	4.00	30	70	-	-	100
3	BECSE303T	Professional core courses	Operating System	3	-	-	3.00	30	70	-	-	100
4	BECSE304T	Professional core courses	Computer Architecture & Digital System	3	1	-	4.00	30	70	-	-	100
5	BECSE305T	Professional core courses	Ethics in IT	3	-	-	3.00	30	70	-	-	100
6	BECSE306T	Humanities Social and Management Courses	Universal Human Values	2	-	-	2.00	15	35	-	-	50
7	BECSE307T	Mandatory Course	Environment Science (Audit)	2	-	-	0.00	-	-	-	-	-
8	BECSE302P	Professional core courses	Object Oriented Programming with Java Lab	-	-	2	1.00	-	-	25	25	50
9	BECSE303P	Professional core courses	Operating System Lab	-	-	2	1.00	-	-	25	25	50
10	BECSE308P	Professional core courses	Computer Workshop-I Lab	-	-	2	1.00	-	-	25	25	50
<b>Total</b>				<b>19</b>	<b>3</b>	<b>6</b>	<b>23.00</b>	<b>165</b>	<b>385</b>	<b>75</b>	<b>75</b>	<b>700</b>

*S. Sonekar*  
Dr. S. V. Sonekar  
Chairman.

**RTMNU B.E. SCHEME OF EXAMINATION 2021-22**  
**Scheme of Teaching & Examination of Bachelor of Engineering IV Semester B.E. (Computer Science and Engineering)**

Sr. No.	Course Code	Category	Course Name	Hours/Week			Credits	Maximum Marks				Total
				L	T	P		Theory		Practical		
								Internal	University	Internal	University	
1	BECSE401T	Basic sciences	Discrete Mathematics and Graph Theory	3	0	0	3.00	30	70	-	-	100
2	BECSE402T	Professional core courses	Data Structure and Program Design	3	1	0	4.00	30	70	-	-	100
3	BECSE402P	Professional core courses	Data Structure and Program Design Lab	0	0	2	1.00	-	-	25	25	50
4	BECSE403T	Professional core courses	Database Managements Systems	3	0	0	3.00	30	70	-	-	100
5	BECSE403P	Professional core courses	Database Managements Systems Lab	0	0	2	1.00	-	-	25	25	50
6	BECSE404T	Professional core courses	Computer Networks	3	0	0	3.00	30	70			100
7	BECSE405T	Professional core courses	Theory of Computation	3	1	0	4.00	30	70	-	-	100
8	BECSE406T	Professional core courses	System Programming	3	0	0	3.00	30	70			100
9	BECSE407P	Professional core courses	Computer Workshop-II (Python)	0	0	2	1.00	-	-	25	25	50
10	BECSE408	Project-CS	Internship	0	0	2	1.00	-	-	50	-	50
<b>Total</b>				<b>18</b>	<b>2</b>	<b>8</b>	<b>24.00</b>	<b>180</b>	<b>420</b>	<b>125</b>	<b>75</b>	<b>800</b>


  
 Dr. S.V. Sonelkar  
 Chairman

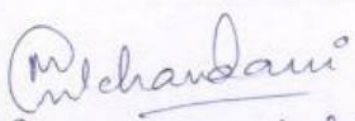
**RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**  
**FOUR YEAR BACHELOR OF TECHNOLOGY (B.Tech) DEGREE COURSE**  
**SEMESTER: V (C.B.C.S.)**  
**BRANCH: COMPUTER SCIENCE AND ENGINEERING**


**Fifth Semester:-**

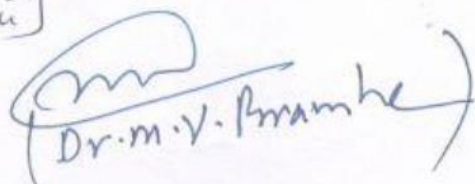
S. N.	Subject	Teaching Scheme			Evaluation Scheme			Credits	Category
		L	T	P	CA	UE	Total		
1	Artificial Intelligence	3	1	-	30	70	100	4	PCC-CS
2	Artificial Intelligence-Lab	-	-	2	25	25	50	1	PCC-CS
3	Design & Analysis of Algorithms	3	1	-	30	70	100	4	PCC-CS
4	Design & Analysis of Algorithms -Lab	-	-	2	25	25	50	1	PCC-CS
	Software Engineering & Project Management	3	-	-	30	70	100	3	PCC-CS
5	Elective-I	3	-	-	30	70	100	3	PEC-CS
6	Effective Technical Communication	2	-	-	15	35	50	2	HSMC
7	Professional Skills Lab I			2	25	25	50	1	ESC
8	Yoga and Meditation (Audit Course)	2	-	-	50	-	-	Audit	MC
	<b>Total</b>	<b>16</b>	<b>02</b>	<b>06</b>			<b>600</b>	<b>19</b>	

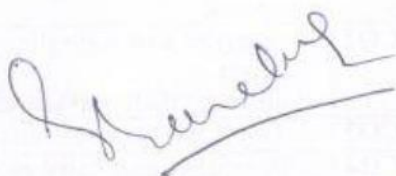
**Elective-I: 1. TCP/IP    2. Design Patterns    3. Data Warehousing and Mining**

  
 [Mrs. B.P. Chavaskar]

  
 [Ms. Mona Mulchandani]

  
 [Dr. S.V. Sonekar]

  
 (Dr. M.V. Pramhe)

  
 Dr. S.V. Sonekar  
 Chairman

**RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**  
**FOUR YEAR BACHELOR OF TECHNOLOGY (B. Tech..) DEGREE COURSE**  
**SEMESTER: VI (C.B.C.S.)**

**BRANCH: COMPUTER SCIENCE AND ENGINEERING**

**Examination Scheme and Syllabus**

**Sixth Semester:-**

S. N.	Subject	Teaching Scheme			Evaluation Scheme			Credits	Category
		L	T	P	CA	UE	Total		
1	Compiler Design	4	-	-	30	70	100	4	PCC-CS
2	Compiler Design -Lab	-	-	2	25	25	50	1	PCC-CS
3	Elective-II	3	-	-	30	70	100	3	PEC-CS
4	Elective-III	3	-	-	30	70	100	3	PEC-CS
5	Open Elective-I	3	-	-	30	70	100	3	OEC
6	Professional Skills Lab II	-	-	2	25	25	50	1	PCC-CS
7	Hardware Lab	-	-	2	25	25	50	1	ESC
8	Mini Project	-	-	6	50	50	100	3	PROJ-CS
9	Economics of IT Industry	2	-	-	15	35	50	2	HSMC
10	Intellectual Property Rights (Audit Course)	2	-	-	50	-	-	Audit	PCC
	<b>Total</b>	<b>17</b>	<b>-</b>	<b>12</b>			<b>700</b>	<b>21</b>	

**Elective-II:** - 1. Machine Learning 2. Internet of Things 3. Cluster and Cloud Computing

**Elective-III:** - 1. Data Science 2. Distributed Operating Systems 3. Human Computer Interaction

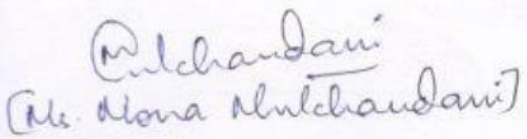
**Open Elective I:-** 1. Linux Fundamentals 2. Android Application Development 3. Blockchain Technologies

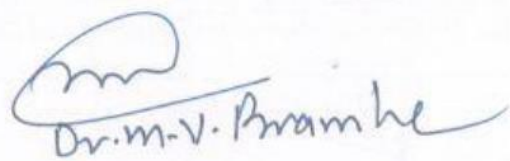


[ Mrs. B.P. Dharaskar ]



Dr. S.V. Sonelkar  
Chairman

  
[ Mrs. Anona Mutchandani ]

  
Dr. M.V. Bramhe

**FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE****SEMESTER: SEVENTH (C.B.S.)****BRANCH: COMPUTER SCIENCE & ENGINEERING**

Sr. No.	Subject	Workload				Credit				Marks				
		L	P	T	Total	L	P	T	Total	Theory		Practical		Total Marks
										Sess.	Univ.	Sess.	Uni.	
1 BECSE401T	Data Warehousing & Mining	4	-	1	5	4	-	1	5	20	80	-	-	100
2 BECSE401P	Data Warehousing & Mining Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
3 BECSE402T	Language Processor	4	-	1	5	4	-	1	5	20	80	-	-	100
4 BECSE402P	Language Processor Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
5 BECSE403T	ELECTIVE-I	4	-	1	5	4	-	1	5	20	80	-	-	100
6 BECSE404T	ELECTIVE-II	4	-	1	5	4	-	1	5	20	80	-	-	100
7 BECSE405P	Project and Seminar	-	3	-	3	-	3	-	3	-	-	25	25	50
	<b>Total</b>	<b>16</b>	<b>7</b>	<b>4</b>	<b>27</b>	<b>16</b>	<b>5</b>	<b>4</b>	<b>25</b>	<b>80</b>	<b>320</b>	<b>75</b>	<b>75</b>	<b>550</b>

**Elective I:** TCP and IP, Advanced Computer Architecture, Big Data Analysis & Business Intelligence, Parallel and Network Algorithm.

**Elective II:** Computational Geometry, Mobile Computing, Real Time Operating System, Software Architecture, Mainframe Technologies.

**FOUR YEAR BACHELOR OF ENGINEERING (B.E.) DEGREE COURSE****SEMESTER: EIGHTH (C.B.S.)****BRANCH: COMPUTER SCIENCE & ENGINEERING**

Sr. No.	Subject	Workload				Credit				Marks				
		L	P	T	Total	L	P	T	Total	Theory		Practical		Total Marks
										Sess.	Univ.	Sess.	Uni.	
1 BECSE406T	Distributed Operating system	4	-	1	5	4	-	1	5	20	80	-	-	100
2 BECSE406P	Distributed Operating system Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
3 BECSE407T	Information & Cyber Security	4	-	1	5	4	-	1	5	20	80	-	-	100
4 BECSE407P	Information & Cyber Security Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
5 BECSE408T	ELECTIVE-III	4	-	1	5	4	-	1	5	20	80	-	-	100
6 BECSE409T	ELECTIVE-IV	4	-	1	5	4	-	1	5	20	80	-	-	100
7 BECSE410P	Project & Seminar	-	5	-	5	-	5	-	5	-	-	75	75	150
	<b>Total</b>	<b>16</b>	<b>9</b>	<b>4</b>	<b>29</b>	<b>16</b>	<b>7</b>	<b>4</b>	<b>27</b>	<b>80</b>	<b>320</b>	<b>125</b>	<b>125</b>	<b>650</b>

**Elective III:** Pattern Recognition, Soft Computing Techniques, Optimization Techniques, Clustering & Cloud Computing.**Elective IV:** Advance Wireless Sensor Network, Digital Image Processing, Natural Language Processing, Digital Forensic.

## Electronics and telecommunication

<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <h3 style="margin: 0;">Rashtrasant Tukadoji Maharaj Nagpur University</h3> <p style="margin: 0; font-size: small;">Formerly Known as Nagpur University</p> </div> </div>															
SCHEME OF EXAMINATION FOR															
B. E. SEVENTH SEMESTER (ELECTRONICS & COMMUNICATION / ELECTRONICS & TELECOMMUNICATION ENGINEERING )															
Sub Code	Board	SUBJECT	Work Load				Credit				Marks				Total Marks
			L	P	T	Total	L	P	T	Total	Internal	Unive rsity	Internal	Unive rsity	
BEECE701T/ BEETE701T	Electronics	DSP Processor & Architecture	4	0	1	5	4	0	1	5	20	80	0	0	100
BEECE701P/ BEETE701P	Electronics	DSP Processor & Architecture	0	2	0	2	0	1	0	1	0	0	25	25	50
BEECE702T/ BEETE702T	Electronics	Television & Video Engineering	4	0	1	5	4	0	1	5	20	80	0	0	100
BEECE702P/ BEETE702P	Electronics	Television & Video Engineering	0	2	0	2	0	1	0	1	0	0	25	25	50
BEECE703T/ BEETE703T	Electronics	Optical Communication	4	0	0	4	4	0	0	4	20	80	0	0	100
BEECE704T/ BEETE704T	Electronics	Advanced Digital System Design	4	0	1	5	4	0	1	5	20	80	0	0	100
BEECE704P/ BEETE704P	Electronics	Advanced Digital System Design	0	2	0	2	0	1	0	1	0	0	25	25	50
BEECE705T/ BEETE705T	Electronics	Elective-I	3	0	1	4	3	0	1	4	20	80	0	0	100
BEECE706P/ BEETE706P	Electronics	Project Seminar	0	2	0	2	0	2	0	2	0	0	50	0	50
<b>Total</b>			<b>19</b>	<b>8</b>	<b>4</b>	<b>31</b>	<b>19</b>	<b>5</b>	<b>4</b>	<b>28</b>	<b>100</b>	<b>400</b>	<b>125</b>	<b>75</b>	<b>700</b>

**Elective-I** – 1. Fuzzy Logic & Neural Network    2. Microelectromechanical Systems and System On Chip    3. Data Compression & Encryption  
4. VLSI Signal Processing



# Rashtrasant Tukadoji Maharaj Nagpur University

Formerly Known as Nagpur University



## SCHEME OF EXAMINATION FOR

### B.E. EIGHTH SEMESTER (ELECTRONICS & COMMUNICATION / ELECTRONICS & TELECOMMUNICATION ENGINEERING)

Sub Code	Board	SUBJECT	Work Load				Credit				Marks				Total Marks
			L	P	T	Total	L	P	T	Total	Theory		Practical		
											Internal	Unive rsity	Internal	Unive rsity	
BEECE801T/ BEETE801T	Electronics	Microwave & Radar Engineering	4	0	0	4	4	0	0	4	20	80	0	0	100
BEECE801P/ BEETE801P	Electronics	Microwave & Radar Engineering	0	2	0	2	0	1	0	1	0	0	25	25	50
BEECE802T/ BEETE802T	Electronics	Computer Communication Network	4	0	1	5	4	0	1	5	20	80	0	0	100
BEECE802P/ BEETE802P	Electronics	Computer Communication Network	0	2	0	2	0	1	0	1	0	0	25	25	50
BEECE803T/ BEETE803T	Electronics	Wireless & Mobile Communication	4	0	0	4	4	0	0	4	20	80	0	0	100
BEECE804T/ BEETE804T	Electronics	Elective-II	3	0	1	4	3	0	1	4	20	80	0	0	100
BEECE805T/ BEETE805T	Electronics	Elective-III	3	0	1	4	3	0	1	4	20	80	0	0	100
BEECE806P/ BEETE806P	Electronics	Project	0	6	0	6	0	6	0	6	0	0	75	75	150
<b>Total</b>			<b>18</b>	<b>10</b>	<b>3</b>	<b>31</b>	<b>18</b>	<b>8</b>	<b>3</b>	<b>29</b>	<b>100</b>	<b>400</b>	<b>125</b>	<b>125</b>	<b>750</b>

**Elective-II** – 1. Wireless Sensor Network 2. Embedded System 3. Digital Image Processing 4. Artificial Intelligence

**Elective-III** – 1. Random Signal Theory 2. Robotics & Automation 3. Satellite Communication 4. CMOS VLSI Design



# R.T.M. Nagpur University, Nagpur

## SCHEME OF EXAMINATION

### B.E. ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING/ ELECTRONICS ENGINEERING (SEMESTER – III)

Code	Subject	Teaching Scheme				Credit				MARKS				
		L	Practical	Tutorial / Activity	Total	L	P	T/A	Total	Theory		Practical		Total Marks
										Internal	Univ.	Internal	Univ.	
BEETC-301	Applied Maths-III	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-302T	Components for Electronic circuit design	3	-		3	3	-	-	3	30	70	-	-	100
BEETC-302P	Components for Electronic circuit design Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-303T	Digital System Design	3	-	1T	4	3	-	1	4	30	70	-	-	100
BEETC-303P	Digital System Design Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-304P	Network Theory	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-305T	Signal & System	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-306T	Measurement and Instrumentation	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-307P	Electronics Workshop I Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-308T	Consumer affairs	2	-		2							-	-	Audit
	<b>Total</b>	<b>20</b>	<b>6</b>	<b>1T</b>	<b>27</b>	<b>18</b>	<b>3</b>	<b>1</b>	<b>22</b>	<b>180</b>	<b>420</b>	<b>75</b>	<b>75</b>	<b>750</b>

**SCHEME OF EXAMINATION FOR  
B.E. ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING/ ELECTRONICS  
ENGINEERING  
(SEMESTER – IV)**

Code	Subject	Teaching Scheme				Credit				MARKS				
		L	Practical	Tutorial / Activity	Total	L	P	T/A	Total	Theory		Practical		Total Marks
										Internal	University	Internal	Univ.	
BEETC-401T	Microcontrollers & Applications	3	-	1T	4	3	-	1	4	30	70	-	-	100
BEETC-401P	Microcontrollers & Applications Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-402T	Analog & Digital Communications	3	-	1T	4	3	-	1	4	30	70	-	-	100
BEETC-403P	Analog and Digital Electronics Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-404T	Analog System Design	3	-	1T	4	3	-	1	4	30	70	-	-	100
BEETC-405T	Data structure & Algorithm	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-406T	HSC: Numerical Mathematics and Probability Using MATLAB	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-407T	Programming for problem solving	2	-	-	2	2	-	-	2	15	35	-	-	50
BEETC-407P	Programming for problem solving Lab	-	4	-	4	-	2	-	2			25	25	50
BEETC-408I	Internship								1			50	-	50
BEETC-409A	Universal human values	3			3	3			3	30	70			100
	<b>Total</b>	<b>20</b>	<b>8</b>	<b>3T</b>	<b>31</b>	<b>20</b>	<b>4</b>	<b>3</b>	<b>28</b>	<b>195</b>	<b>455</b>	<b>125</b>	<b>75</b>	<b>850</b>

- L- Lecture , P-Practical, T- Tutorial , A- Activity
- Audit course marks are not counted in total marks

**SCHEME OF EXAMINATION FOR  
B.Tech. ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING  
(SEMESTER – V)**

Code	Subject	Teaching Scheme				Credits				MARKS				
										Theory		Practical		Total Marks
		L	P	T/A	Total	L	P	T/A	Total	Internal	Univ.	Internal	Univ.	
BEETC-501T	Embedded System Design	2	-	1T	3	2	-	1	3	30	70	-	-	100
BEETC-501P	Embedded System Design Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-502T	Electromagnetic Waves	3	-	1T	4	3	-	1	4	30	70	-	-	100
BEETC-503T	Digital Signal Processing	3	-	-	3	3	-	-	3	30	70	-	-	100
BEETC-503P	Digital Signal Processing Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-504OT	HSC: IEED(Economics)	2	-	1A	3	2	-	1	3	30	70			100
BEETC-505PE	PEC-I	2	-	1T	3	2	-	1	3	30	70	-	-	100
BEETC-506P	Electronic Workshop II	-	2	-	2		1	-	1	-	-	25	25	50
BEETC-507A	Audit Course													AUDIT
	<b>Total</b>	<b>12</b>	<b>6</b>	<b>3T+1A</b>	<b>22</b>	<b>12</b>	<b>3</b>	<b>4</b>	<b>19</b>	<b>150</b>	<b>350</b>	<b>75</b>	<b>75</b>	<b>650</b>

**SCHEME OF EXAMINATION FOR  
B.Tech. ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING  
(SEMESTER – VI)**

Code	Subject	Teaching Scheme				Credit				MARKS				Total Marks
		L	P	T/A	Total	L	P	T/A	Total	Theory		Practical		
										Internal	Univ.	Internal	Univ.	
BEETC-601T	Computer Communication Network	2	-	-	2	2	-	-	2	30	70	-	-	100
BEETC-601P	Computer Communication Network Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-602T	Internet of Things (IOT)	2	-	-	2	2	-	-	2	30	70	-	-	100
BEETC-602P	IOT Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-603T	Wireless Sensor Network	2	-	-	2	2	-	-	2	30	70	-	-	100
BEETC-603P	Wireless Sensor Network Lab	-	2	-	2	-	1	-	1	-	-	25	25	50
BEETC-604PE	PEC-II	2	-	1T	3	2	-	1	3	30	70	-	-	100
BEETC-605OE	OE-I	2	-	1A	3	2	-	1	3	30	70	-	-	100
BEETC-606T	HSC: Effective Technical Communication	2		-	2	-	-	2	2	15	35	-	-	50
BEETC-607I	Mini Project(Internship)	-		3A	3	--	-	3	3	-	-	25	25	50
BEETC-608A	Audit Course	-								-	-			AUDIT
<b>Total</b>		<b>12</b>	<b>6</b>	<b>1T+4A</b>	<b>23</b>	<b>10</b>	<b>3</b>	<b>7</b>	<b>20</b>	<b>165</b>	<b>385</b>	<b>100</b>	<b>100</b>	<b>750</b>

## Mechanical Engineering

Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur  
Faculty of Science & Technology  
Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)  
V Semester B. Tech (Mechanical Engineering)

Sr No	Course Code	Category	Course Title	Teaching Scheme (Hours/Week)			Credits	Examination Scheme								
				L	T	P		Theory				Practical				
								Duration of Exam (Hrs)	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks
1	BEME501T	Professional core courses	Heat Transfer	3	1	-	4	3	30	70	100	45				
2	BEME501P	Professional core courses	Heat Transfer Lab	-	-	2	1		-	-	-	-	25	25	50	25
3	BEME502T	Professional core courses	Energy Conversion-I	3	1	-	4	3	30	70	100	45	-	-	-	-
4	BEME503T	Professional core courses	Design of Machine Elements	3	1	-	4	3	30	70	100	45	-	-	-	-
5	BEME503P	Professional core courses	Design of Machine Elements Lab	-	-	2	1		-	-	-	-	25	25	50	25
6	BEME504T	Humanities, Social Sciences & Management courses	Industrial Economics and Management	3	-	-	3	3	30	70	100	45	-	-	-	-
7	BEME505T	Open Elective Course	Open Elective - 1	3	-	-	3	3	30	70	100	45	-	-	-	-
8	BEME506P	Project work, seminar and internship in industry or elsewhere	Industrial Visit*	-	-	2	1		-	-	-	-	50	-	50	25
9	BEME507P	Mandatory Course	Performing Art	-	-	3	Audit (0)	College Assessment in Grades O, A, B, C (Evaluation guidelines mentioned in the syllabus of concerned course)								
TOTAL				15	3	9	-	-	150	350	500	-	100	50	150	-
Semester Total				27			21	Marks 650								

*S. V. K. Chaudhary*  
Chairman -  
B.O.S.  
Mech. Engg

Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur  
Faculty of Science & Technology  
Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)  
VI Semester B. Tech. (Mechanical Engineering)

Sr No	Course Code	Category	Course Title	Teaching Scheme (Hours/Week)			Credits	Examination Scheme								
				L	T	P		Theory				Practical				
								Duration of Exam (Hrs)	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks
1	BEME601T	Professional core courses	Automation in Production	3	1	-	4	3	30	70	100	45	-	-	-	-
2	BEME601P	Professional core courses	Automation in Production Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
3	BEME602T	Professional core courses	Energy Conversion-II	3	1	-	4	3	30	70	100	45	-	-	-	-
4	BEME602P	Professional core courses	Energy Conversion Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
5	BEME603T	Professional core courses	Dynamics of Machines	3	1	-	4	3	30	70	100	45	-	-	-	-
6	BEME603P	Professional core courses	Dynamics of Machines Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
7	BEME604T	Professional Elective courses	Elective - I	3	-	-	3	3	30	70	100	45	-	-	-	-
8	BEME605T	Professional Elective courses	Elective - II	3	-	-	3	3	30	70	100	45	-	-	-	-
* 9	BEME606P	Project work, seminar and internship in industry or elsewhere	Skill Development*	-	-	4	2	-	-	-	-	-	50	-	50	25
10	BEME607P	Project work, seminar and internship in industry or elsewhere	Summer Internship**	During Summer Vacation			Audit (0)	-	-	-	-	-	-	-	-	-
11	BEME608P	Mandatory Course	Environment Science	-	-	2	Audit (0)	College Assessment in Grades O, A, B, C (Evaluation guidelines mentioned in the syllabus of concerned course)								
<b>TOTAL</b>				<b>15</b>	<b>3</b>	<b>13</b>	-	-	<b>150</b>	<b>350</b>	<b>500</b>	-	<b>125</b>	<b>75</b>	<b>200</b>	-
<b>Semester Total</b>				<b>31</b>			<b>23</b>	<b>Marks 700</b>								

*Sd/-*  
C. Dr. S. H. Choudhary  
Chairman  
B.O.S.  
Mechanical Engg

**Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur**  
**Faculty of Engineering & Technology**  
**Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)**

**VII Semester B.E. (Mechanical Engineering)**

Subject Code	Subject	Teaching Scheme				Examination Scheme								
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks University Assessment	Max. Marks College Assessment	Total Marks	Min. Passing Marks	Max. Marks University Assessment	Max. Marks College Assessment	Total Marks	Min. Passing Marks
BEME701T	Industrial Engineering	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME702T	Elective-I	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME703T	Computer Aided Design	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME703P	Computer Aided Design	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME704T	Energy Conversion - II	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME704P	Energy Conversion - II	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME705T	Design of Mechanical Drives	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME705P	Design of Mechanical Drives	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME706P	Project Seminar	-	-	03	03	-	-	-	-	-	-	50	50	25
<b>Total</b>		<b>15</b>	<b>05</b>	<b>09</b>	<b>-</b>	<b>-</b>	<b>400</b>	<b>100</b>	<b>500</b>	<b>-</b>	<b>75</b>	<b>125</b>	<b>200</b>	<b>-</b>
<b>Semester Total</b>		<b>29</b>			<b>26</b>	<b>700 Marks</b>								

**Elective – I (BEME702T):**

BEME702T1: Industrial Robotics  
 BEME702T4: Power Plant Engineering

BEME702T2: Tool Design  
 BEME702T5: Synthesis of Mechanisms

BEME702T3: Automobile Engineering  
 BEME702T6: Material Handling System

All subjects pertain to Board of Studies in Mechanical Engineering.

**Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur**  
**Faculty of Engineering & Technology**  
**Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)**

**VIII Semester B.E. (Mechanical Engineering)**

Subject Code	Subject	Teaching Scheme				Examination Scheme								
		Hours per week			No. of Credits	Theory					Practical			
		L	T	P		Duration of Paper (Hrs.)	Max. Marks University Assessment	Max. Marks College Assessment	Total Marks	Min. Passing Marks	Max. Marks University Assessment	Max. Marks College Assessment	Total Marks	Min. Passing Marks
BEME801T	Industrial Management	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME802T	Elective – II	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME802P	Elective – II	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME803T	Elective – III	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME804T	Automation in Production	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME804P	Automation in Production	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME805T	Energy Conversion - III	03	01	-	04	03	80	20	100	40	-	-	-	-
BEME805P	Energy Conversion - III	-	-	02	01	-	-	-	-	-	25	25	50	25
BEME806P	Project	-	-	06	06	-	-	-	-	-	75	75	150	75
Total		15	05	12		-	400	100	500	-	150	150	300	-
<b>Semester Total</b>		<b>32</b>			<b>29</b>	<b>800 Marks</b>								

**Elective – II (BEME802T, BEME802P):**

BEME802T1/P1: Finite Element Method  
 BEME802T4/P4: Management Information Systems

BEME802T2/P2: Computer Integrated Manufacturing  
 BEME802T5/P5: Refrigeration & Air-Conditioning

BEME802T3/P3: Industrial Fluid Power  
 BEME802T6/P6: Stress Analysis

**Elective – III (BEME803T):**

BEME803T1: Advanced Manufacturing Techniques  
 BEME803T4: Mechanical Vibrations

BEME803T2: Machine Tool Design  
 BEME803T5: Advance I.C. Engine

BEME803T3: Renewable Energy Systems  
 BEME803T6: Tribology

All subjects pertains to Board of Studies in Mechanical Engineering.



Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur  
Faculty of Science & Technology  
Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)  
III Semester B. Tech (Mechanical Engineering)

Sr No	Course Code	Category	Course Title	Teaching Scheme (Hours/Week)			Credits	Examination Scheme								
				L	T	P		Theory				Practical				
								Duration of Exam (Hrs)	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks
1	BEME301T	Basic Science course	Applied Mathematics – III	3	1	-	4	3	30	70	100	45	-	-	-	-
2	BEME302T	Professional core courses	Manufacturing Processes	3	-	-	3	3	30	70	100	45	-	-	-	-
3	BEME302P	Professional core courses	Manufacturing Processes Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
4	BEME303T	Professional core courses	Engineering Thermodynamics	3	1	-	4	3	30	70	100	45	-	-	-	-
5	BEME304T	Professional core courses	Kinematics of Machines	3	1	-	4	3	30	70	100	45	-	-	-	-
6	BEME305P	Professional core courses	Machine Drawing & Solid Modelling	-	1	2	2	-	-	-	-	-	50	50	100	50
7	BEME306P	Professional core courses	Computer Programming	-	1	2	2	-	-	-	-	-	50	50	100	50
8	BEME307P	Mandatory Course	Sports / Yoga / NSS/NCC	-	-	3	Audit (0)	College Assessment in Grades O, A, B, C (Evaluation guidelines mentioned in the syllabus of concerned course)								
Total				12	5	9	-	-	120	280	400	-	125	125	250	-
Semester Total				26			20	Marks 650								

*Sd/-*  
Dr. S. K. Chaudhary  
Chairman  
B.O.S.  
Mechanical Engg.

Rashtrasant Tukdoji Maharaj Nagpur University, Nagpur  
Faculty of Science & Technology  
Course and Examination Scheme of Bachelor of Engineering (Mechanical Engineering)  
IV Semester B. Tech (Mechanical Engineering)

Sr No	Course Code	Category	Course Title	Teaching Scheme (Hours/Week)			Credits	Examination Scheme								
				L	T	P		Theory				Practical				
								Duration of Exam (Hrs)	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks	Max. Marks College Assessment	Max. Marks University Assessment	Total Marks	Min. Passing Marks
1	BEME401T	Professional core courses	Machining Processes	3	-	-	3	3	30	70	100	45	-	-	-	-
2	BEME401P	Professional core courses	Machining Processes Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
3	BEME402T	Professional core courses	Fluid Mechanics & Hydraulic Machines	3	1	-	4	3	30	70	100	45	-	-	-	-
4	BEME402P	Professional core courses	Fluid Mechanics & Hydraulic Machines Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
5	BEME403T	Professional core courses	Material Science & Engineering	3	-	-	3	3	30	70	100	45	-	-	-	-
6	BEME404T	Professional core courses	Mechanics of Materials	3	1	-	4	3	30	70	100	45	-	-	-	-
7	BEME404P	Professional core courses	Materials Testing Lab	-	-	2	1	-	-	-	-	-	25	25	50	25
8	BEME405T	Humanities & Social Science	Professional Ethics	3	-	-	3	2	30	70	100	45	-	-	-	-
9	BEME406P	Mandatory Course	Sports /Yoga / NSS/NCC	-	-	3	Audit (0)	College Assessment in Grades O, A, B, C (Evaluation guidelines mentioned in the syllabus of concerned course)								
<b>TOTAL</b>				<b>15</b>	<b>2</b>	<b>9</b>	-	-	<b>150</b>	<b>350</b>	<b>500</b>	<b>-</b>	<b>75</b>	<b>75</b>	<b>150</b>	<b>-</b>
<b>Semester Total</b>				<b>26</b>			<b>20</b>	<b>Marks 650</b>								

*Dr. S. K. Chaudhary*  
Chairman  
B.D.S.  
Mechanical Engg.

## Syllabus-First Year Engineering

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05

### Suggested References:

- S.K. HajaraChaudhary- Workshop Technology-Media Promotors and Publishers, New Delhi
- B.S. Raghuvanshi- Workshop Technology- DhanpatRai and sons, New Delhi
- H.S.Bawa- Workshop Technology- Tata McGraw Hill Publishers,New Delhi
- Kent's Mechanical Engineering Hand book- John Wiley and Sons, New York
- Electronics Trade & technology Development Corporation.(A Govt. of India undertaking) Akbar Hotel Annex, Chanakyapuri, New Delhi- 110 021
- Learning Materials Transparencies and CDs, CBT Packages developed by N.I.T.T.E.R. and other organizations.

### Notes:

A journal shall consist of one job assignment each on the topics 1 to 4 mentioned above.

Each assignment shall consist of--

- Procedural steps in completing a given job
- Description and drawings of different tools used
- List of safety equipments used and safety rules observed during working

Notes: 1] The subject teacher should provide necessary theory inputs to students of all shops before their actual practical.

2] The instructor shall give demonstration to the students by preparing a specimen job as per the job drawing.

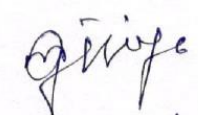
3] The workshop diary shall be maintained by each student duly signed by instructor of respective shop

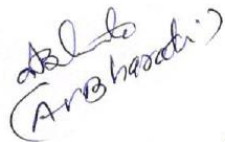
4] Workshop Tool Manual at institute level shall be provided to the students

5] Distribution of Continuous Assessment marks is as follows:

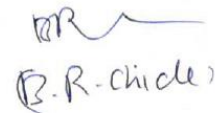
20 marks for jobscompleted (05 marks for each job)+ 05 marks for Practical journal= Total 25 marks

6] University Examination – Performance of any one job as mentioned in list of practical and oral.

  
Dr. M. N. Giriya

  
(A. B. Chaudhary)



  
(B. R. Chidde)

**RTM Nagpur University**  
**Syllabus (Practical)**

Semester	Course Title(Subject)	Hours / Week			Credits	Maximum Marks		
		L	T	P		Continual Assessment	University Examination	Total
Semester II   First Year	Workshop Practices Code: BSE2-5P	-	-	4	2	50	50	100

**Course Outcomes**

After successful completion of this course the student will be able to:

CO1	Read and interpret job drawing and plan operations
CO2	Identify and select proper material, tools, equipments, machines and proper operational parameters.
CO3	Set tools, work piece, and machines for desired operations.
CO4	Complete job of Carpentry, Fitting, Welding and Smithy as per job drawing in allotted time.
CO5	Use safety equipment and follow safety procedures during operations.
CO6	Inspect the job for confirming desired dimensions and shape.

**List of Practical's**

Sr. No.	List of Practical's
01	<b>CARPENTRY SHOP</b> <ul style="list-style-type: none"> <li>Demonstration of different wood working tools and machines.</li> <li>Demonstration of different wood working processes, like planing, marking, chiseling, grooving, turning of wood etc.</li> </ul> One simple job involving any one joint like mortise and tenon, dovetail, bridle, half lap etc. ( 4 Hours of actual working)
02	<b>FITTING SHOP:</b> <ul style="list-style-type: none"> <li>Demonstration of different fitting tools and drilling machines and power tools.</li> <li>Demonstration of different operations like chipping, filing, drilling, tapping, cutting etc.</li> </ul> One simple fitting job involving practice of chipping, filing, drilling, tapping, cutting etc.
03	<b>WELDINGSHOP :</b> <p>Demonstration of different welding tools / machines. Demonstration on Arc Welding, Gas Welding, gas cutting. One simple job involving butt and lap joint. For each students.</p>
04	<b>SMITHY SHOP</b> <ul style="list-style-type: none"> <li>Demonstration of different forging tools and Power Hammer.</li> <li>Demonstration of different forging processes, likes shaping, caulking fullering, setting down operations etc.</li> <li>One job like hook peg, flat chisel or any hardware item.</li> </ul>

*Dr. S. D. Ambar*

*Dr. S. D. Ambar*

*Dr. S. D. Ambar*

*Dr. S. D. Ambar*

## Unit-V

1. Industrial Democracy
2. Works Organization: Formal and Informal Organization
3. Concept of Power, Authority and Status system;
4. Industrialization, Urbanization and Study of Slums in India . (5 Hours)

## Books Recommended:

- 1) A New Look into Social Sciences- Shabbir, Sheik and Dwadashiwar
- 2) An Introduction to Sociology- Vidya Bhushan and Sachdeva
- 3) Social Science: The Indian Scene-Yogesh Atal
- 4) Applied Humanities-Rajni Tandon
- 5) A History of World Civilizations-J.E.Swain
- 6) Industrial Psychology-Haire Mason
- 7) Introduction to Constitution of India- Durga Das Basu
- 8) Industrial Sociology in India-N.R.Seth
- 9) Human Resource Development and Management- Dr.A.M.Sheikh
- 10) The Economics of Sustainable Development-Surender Kumar

Note: As AICTE has recommended that students of Engineering should learn about Indian Constitution and Indian tradition, we propose above non-credit subject entitled 'Indian Culture and Constitution' to be included in second semester for all branches.

*Abhis*

*Adul*  
(Ar. Bharati)

*Girija*

*Anm. n. Girija*

*BR*

(B-R. chide)

**SYLLABUS:**

## Unit-I

1. Concept of Culture and Civilization
2. Vedic Civilization and Indus Valley Civilization
3. Introduction to Vedas, Ashram system, Varna System
4. Concept of Social Engineering (5 Hours)

## Unit-II

1. Meaning and Scope of Industrial Psychology and Industrial Sociology
2. Recruitment, Selection and Training of Workers,
3. Fatigue in industry.
4. Motives for work in industry (5 Hours)

## Unit-III

1. Sustainable Development
2. Social change .
3. Professional Ethics
4. Concept and styles of Leadership in Industry. (4 Hours)

## Unit-IV

1. Indian Constitution and Federal System
2. Fundamental Rights and Directive Principles of State Policy
3. Role of Bureaucracy in Modern Society
4. Socio-Legal Awareness: Right to Information(RIL), Public Interest Litigation(PIL) (5 Hours)

*Abhishek*

*Abhishek*

*Giriya*  
Dr M. N. Giriya

*RR*  
(R. R. Chide)

Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur

Subject: Indian Culture and Constitution (ICC) BSE 2-8 T

Semester: II

Course: Audit (Non-credit), Total Marks: 50 (Internal)

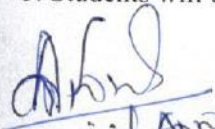
Credit: Nil, Teaching Load: 2(Theory)/week

Course Objective:

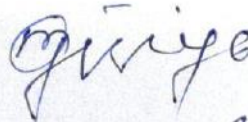
1. To create an understanding of Indian Constitution and develop respect for the same.
2. To create awareness of India as a State Indian culture and Tradition.


Course Outcomes:

1. Students will become aware of Indian culture and civilization and their role in development of society.
2. Students will understand Industrial work-culture.
3. Students will be sensitized towards professional ethics.
4. Students will understand Indian Constitution and governance of the country.
5. Students will be able to understand the structure and system of work organizations.

  
(Dr. Sajid Anwar)

  
(AVB handi)



  
(B. R. Chidambaram)

**Centroids and Moments of Inertia:** Second Moment and products of inertia of plane areas, Moment of inertia of masses. Transfer theorems for moment of inertia and Product of inertia, Polar moment of inertia, Principal axes, Mohr's circle of inertia.

**Virtual Work:** Introduction of Virtual work theorem: Principle of Virtual work applied to equilibrium of Mechanisms, simple beam, Pin jointed frames.

**Unit -IV: (10 Hrs)**

**D'Alembert's Principle,** work Energy method, (Expressions based on center of mass).

**Methods of Momentum :** Linear impulse momentum, considerations for a system of particles, Consideration of linear momentums, Elastic impact of two bodies, Direct central impact.

**Books Recommended:**

1. Engineering Mechanics: F.L Singer
2. Engineering Mechanics: Tmoshenko & Young
3. Engineering Mechanics: Bear and Johnson
4. Engineering Mechanics: I.H.Shames
5. Engineering Mechanics: R.D.Askhedkar & P.B.Kulkarni

Abhis

Arbh  
(Arbh)

Giriya  
Dr. M. N. Giriya (B. R. Chide)



## Engineering Mechanics (BES2-7T)

Total Credits 2

Teaching Scheme  
Lecture : 2

Examination Scheme  
TU: 35 marks TI: 15 Marks

Duration of Exam : 2 Hours

### The Course Objective Is To Impart Knowledge Of

1. To understand the effect of force and moment on the body.
2. To understand the concept of equilibrium and apply the conditions of equilibrium
3. To understand the concept of moment of inertia and apply on rectangular, square, circle or composite section of rectangular, square, circle.
4. To understand the principle of virtual work and apply on connected bodies.
5. To understand the work, energy, D Alemberts Principle and apply on connected bodies.
6. To understand the Impact, Impulse and apply on connected bodies

### After the completion of course student will be able to

1. Students will be able to find effect of force on a body.
2. Students will be able to analyze the effect of a system of forces on a given body with the concepts of Equilibrium & Free body diagram.
3. Students will be able to calculate centroid/C.G. and moments of inertia.
4. Students will be able to solve problem of connected bodies by virtual work principal.
5. Students will be able to solve problem of connected bodies by work, energy, D Alemberts Principle.
6. Students will be able to solve problem of connected bodies by Impact, Impulse.

### Unit - I : Important Vector Quantities: ( 10 Hrs )

Position-vector, moment of a force about a point about an axis, couples, couple moment as a free vector. Equivalent force systems: Resultant of a 2 dimensional distributed loads and three-dimensional general force system Wrench.

### UNIT - II : Equations of Equilibrium: ( 10 Hrs )

Free body diagrams, Equations of equilibrium coplanar concurrent and Non-concurrent systems, General spatial force system.

**Truss:** Analysis of simple pin jointed frames by method of joints method of sections.

**Friction forces:** Law of Coulomb friction, problems involving dry friction, simple applications like wedges and band brakes.

### Unit - III : (10 Hrs)

*(As. Sajid Anwar)*

*(Abhishek Anand)*

*Girija*  
Dr. M. V. Girija (B.R. Chidre)

Basic Electrical Engineering (BSE 2-6T)  
(Total Credits: 02)

Teaching Scheme  
Lectures: 2 Hours/ Week

Examination Scheme  
Theory  
T (U) : 35 Marks T (I) : 15 Marks  
Duration of University Exam. : 02 Hours

- Unit – I: Electric Circuits** (8 Hrs)  
EMF, Potential difference, current, power, Energy (Definition & Units SI), Ohms Law, types of sources (Current & Voltage), Ideal and Practical Sources (Independent Sources only), Source Conversion, Superposition theorem with DC source.  
Circuit element resistance, factors affecting resistance, series & parallel combination of resistances, Kirchoff's Laws (KVL, KCL) statement & Numerical, star Delta transformation, Circuit Element Inductance, Self and Mutual Inductance, Circuit Element Capacitance.
- Unit – II: Magnetic Circuits** (6 Hrs)  
Types of Magnetic Materials, flux, flux density, flux intensity, MMF, reluctance, permanence, permeability, analogous electric circuit, calculation for composite magnetic circuit, concept of leakage flux and fringing, B-H curve, phenomena of magnetic hysteresis.
- Unit - III: AC Circuits** (8 Hrs)  
Generation of single phase voltage, average and RMS value for sinusoidal waveform, periodic function, phasor representation of sinusoidal electrical quantities, steady state behavior of RLC circuit with excitation, reactance, impedance, power and energy in AC circuit, simple numerical on series and parallel AC circuit, concept and importance of power factor, resonance in series circuits. Principal of Generation of three phase voltage, Phase sequence, Star & Delta Connected three phase system, Voltage, Current & Power relations for Balanced three phase system only (With numerical).
- Unit – IV : Single Phase Transformer** (8 Hrs)  
Basic construction of Transformer (core & shell type), Principle of operation, EMF equation, Transformer ratings, No load & On load operation with leakage reactance, losses, efficiency, Definition & formula for voltage regulation, OC & SC test, equivalent circuit of the Transformer.

**Books Recommended:**

- 1) Basic Electrical Engineering: D.C. Kulshreshtha, Tata Mc-Graw Hill Pvt. Ltd.
- 2) A Text Book of Electrical Technology: B. L. Thareja and A. K. Thareja, S. Chand Publication.
- 3) Generation of Electrical Energy: B. R. Gupta 4th Edition, S Chand Publication
- 4) Art & Science of Utilization of Electrical Energy: H. Pratab, III Edition, Dhanpat Rai and Sons.
- 5) Electric Circuits & Network: K. Suresh Kumar, Pearson Publication.

\*\*\*\*\*

*(Dr. Sajid Anwar)*

*(Arbharali)*

*BR*  
*(B. R. Chide)*

*(M. A. Wadh)*  
*Dr. M. N. Gonye*

**Method to conduct the practicals: Out of the two hours allotted:**

The faculty member will teach the basic concepts of practical to the students for 30 minutes.

The next 30 minutes will be on how to implement the problem definition of the practical, i.e., algorithm to implement the problem definition.

The next 1 hour, the students will implement the practical and execute it on computers.

For example: Fundamentals of Loop Control Structures

**Contents:**

To demonstrate the use of "while" control structure.

To demonstrate the use of "do..while" control structure. To demonstrate the use of "for" control structure.

To demonstrate the use of "break" and "continue" construct.

**Cover the concepts of:**

While loop, do..while loop, for loop and break & continue statement.

Explain the implementation of control structure on practical and LCD projector to students. Give one problem definition containing all the concepts of practical and allow students to implement and execute on the computers.

**Books Recommended:**

1. Herbert Schildt - *C Complete Reference* (Tata-McGraw Hill)
2. Byron Gottfried, "Programming with C", Schaum's Outline Series.
3. R Vemugopal & S R Prasad. "Mastering C" Tata-McGraw Hill-2207

\*\*\*\*\*

Abhishek

Abhishek  
(Ar. Chavadi)

DR  
(B. R. Chide)

Dr. M. N. G. G. G.  
Dr. M. N. G. G. G.

**Computational Skills (Total Credits: 01)****SUBJECT CODE: BSE2 – 4P****Teaching Scheme****Practical: 2 Hours/Week****Examination Scheme****Practical****P (U): 25 Marks P (I): 25 Marks****Duration of Internal Practical Exam: 02 Hrs****Students have to perform Practicals based on the theory :****Practical Slot – 1: Fundamentals of Computers and Operating System**

- 1) Demonstrate the internal structure of Computer, its assembly, use of each I/O device and ports.
- 2) Demonstrate the use of System Software like: Windows, Linux .
- 3) Explanation about “C” language Compiler options. Introduction to C++ language.

**Practical Slot – 2: Fundamentals of “C” language**

- 1) To demonstrate all types of operators (Arithmetic, Logical and Relational) of “C” language.
- 2) To demonstrate different data types in “C” language.
- 3) To demonstrate the use of “printf” and “scanf” with all possible options.

**Practical Slot – 3: Fundamentals of Decision Control Structures**

- 1) To demonstrate the use of if-else structure, nested if structure.
- 2) To demonstrate the use of Conditional operators (? Operator).
- 3) To demonstrate the use of Switch.Case construct.

**Practical Slot – 4: Fundamentals of Loop Control Structures**

- 1) To demonstrate the use of “while” control structure.
- 2) To demonstrate the use of “do..while” control structure.
- 3) To demonstrate the use of “for” control structure.
- 4) To demonstrate the use of “break” and “continue” construct

**Practical Slot – 5 and 6: Fundamentals of One Dimensional Arrays**

- 1) To demonstrate the creation of array, addition of an element, deletion of an element and displaying the elements from one dimensional array.
- 2) To demonstrate the implementation of bubble sort, selection sort and insertion sort.
- 3) To demonstrate the implementation of linear search and binary search.

**Practical Slot – 7: Fundamentals of Two Dimensional Arrays**

- 1) To demonstrate the matrix manipulation operations like addition, multiplication.
- 2) To demonstrate the operations on row and columns of two dimensional matrix.

**Practical Slot – 8: Fundamentals of Pointers**

- 1) To demonstrate the pointer declaration and its use.
- 2) To demonstrate the implementation of pointer on array.
- 3) To demonstrate the creation of dynamic arrays using pointer.

**Practical Slot – 9: Fundamentals of Strings**

- 1) To demonstrate the basic operations on string like “length”, “copy”, “reverse”, “truncate”.
- 2) To demonstrate the implementation of two dimensional array of characters.

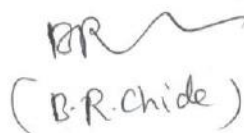
**Practical Slot – 10: Fundamentals of Functions**

- 1) To demonstrate the implementation of functions.
- 2) To demonstrate the call by value parameter passing method.
- 3) To demonstrate the call by reference parameter passing method.

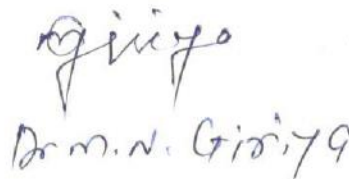
**Practical Slot – 11: Fundamentals of Functions**

- 1) To demonstrate the implementation of recursive function.
- 2) To demonstrate the use of library function (mathematical and string).





(B.R. Chide)



Dr. M. N. Giriy

**Computational Skills**  
(Total Credits: 02)  
**SUBJECT CODE: BSE2 - 4T**

**Teaching Scheme**

**Practical:** 2 Hours/Week

**Examination Scheme**

**Theory**

**T (U):** 35 Marks **T (I):** 15 Marks

**Duration of University Exam:** 02 Hrs

**Unit 1:** Introduction to Programming**(6 Hrs)**

Introduction to components of a computer system (disks, memory, processor, where a program is stored and executed, operating system, compilers etc.)

Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart/Pseudocode with examples.

From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code.

Arithmetic expressions and precedence

**Unit 2:****(10 Hrs)**

- a) Conditional Branching and Loops : Writing and evaluation of conditionals and consequent branching Iteration and loops
- b) Arrays : Arrays (1-D, 2-D), Character arrays and Strings
- c) Basic Algorithms : Searching, Basic Sorting Algorithms (Bubble, Insertion and Selection), Finding roots of equations, notion of order of complexity through example programs (no formal definition required)

**Unit 3:****(8 Hrs)**

- a) Function : Functions (including using built in libraries), Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference
- b) Recursion : Recursion, as a different way of solving problems. Example programs, such as Finding Factorial

**Unit 4:****(6 Hrs)**

- a) Structure : Structures, Defining structures and Array of Structures
- b) Pointers : Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, notion of linked list (no implementation)

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*AS*  
(Sajid Anwar)

*Abhi*  
(A. V. Bhargava)

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*Girija*  
Dr. M. V. Girija

<b>Course Code</b>	<b>BSE2-3P</b>				
<b>Course Title</b>	<b>APPLIED CHEMISTRY LABORATORY</b>				
<b>Scheme &amp; Credits</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>	<b>Semester II</b>
	<b>0</b>	<b>0</b>	<b>3</b>	<b>1.5</b>	

<b>Examination Scheme</b>	
<b>P (U): 25 Marks P (I): 25 Marks</b>	<b>Duration of University Exam. : 03 Hours</b>

### Course Outcomes

After completion of course students will learn to:

- 1) Measure molecular/system properties like, concentrations, surface tension, conductance of solutions etc.
- 2) Estimate the soluble impurities present in the given water sample.
- 3) Handle the different instruments used in chemistry laboratory.

### Students should

- Perform any eight experiments.
- Study of any one experiment in virtual lab topics based on the syllabus.
- Study of any one demonstration experiment.

- 1) Preparation of different solutions molar solution, Normal solution.
- 2) Determination of surface tension of a given liquid solution, percent
- 3) Determination Hardness of water sample by complexometric method.
- 4) Determination of types and extent of alkalinity of water sample
- 5) Determination of free chlorine in water sample by Iodometry
- 6) Determination of cell constant and conductance of a given solution.
- 7) Synthesis of a polymer/drug
- 8) Estimation of Fe/Fe by redox titrimetry
- 9) Determination of capacity of cation exchange resin.
- 10) Determination of Dissolve Oxygen.
- 11) Demonstration of study of Adsorption of Acetic acid by Charcoal.
- 12) Demonstration of Thin layer Chromatography
- 13) Demonstration of Potentiometric titration of an unknown weak Monoprotic Acid
- 14) Virtual Demonstration of UV-Visible spectrophotometer and FTIR (Fourier transformation infrared spectroscopy)
- 15) Virtual Demonstration of Lambert-Beer's Law

### ACTIVITY

Students should perform any one activity

- 1) Drinking water quality analysis Hardness, Alkalinity, pH, TDS
- 2) Titration of Aspirin tablets
- 3) Study of commonly used antacid tablets
- 4) Interpretation of NMR spectra of 10 compounds
- 5) Corrosion of surrounding materials
- 6) Application of chromatography in industry

6. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M.S. Krishnan
7. Physical Chemistry, by P. W. Atkins
8. A Text book of Engineering Chemistry: Shashi Chawla; DhanpatRai& Sons, New Delhi.
9. Engineering Chemistry: A.V. Bharati and Walekar, Tech Max Publications, Pune.
10. Selected Topics in Inorganic Chemistry: Madan, Malik, Tuli.
11. Elementry Organic Spectroscopy by Y. R. Sharma, Published by S. Chand and Company Ltd. New Delhi

- Numerical on Pilling Bedworth Rule
- Types of corrosion- pitting, inter granular, and stress corrosion
- Prevention and control of corrosion- design and material selection, cathodic protection.

### **UNIT-3 Applications of Spectroscopic Techniques**

**(8 Hours) (Marks 14)**

- Principles of spectroscopy and selection rules (Electronic Spectra of Transition Metal Complexes)
- Electronic spectroscopy- basic principles, Lambert-Beer's law, Woodward Fisher Rule for conjugated dienes.
- Numerical on Lambert-Beer's Law
- Numerical on Woodward Fischer Rule
- Fluorescence, Phosphorescence, Jablonski Diagram and its applications.
- Nuclear magnetic resonance - basic principle, chemical shift, spectral interpretation of some simple compounds and magnetic resonance imaging.

### **UNIT-4 Basic Green Chemistry**

**(7 Hours) (Marks 14)**

- Green Chemistry:- Introduction, twelve principles of Green chemistry with examples,
- Numerical based on atom economy
- Carbon sequestration & Carbon Credits,
- Green reagents, Dimethyl carbonate and its applications,
- Supercritical CO<sub>2</sub> properties and applications, uses and applications of biopolymers – polyadipic acid and polycaprolactum.

### **UNIT-5 Water Technology**

**(9 Hours) (Marks 14)**

- Importance of Hardness and Alkalinity of water.
- Industrial Water Treatment: Softening of water-principle, reactions, advantages, limitations and comparison of Zeolite process and De mineralization process.
- Numerical based on Zeolite process.
- Boiler Troubles - (causes, effect on boiler operation and methods of prevention) -Scales and sludges, Caustic embrittlement.
- Desalination of sea water- Principle methods and advantages of electro dialysis and reverse osmosis processes
- Waste Water Treatment (introduction and importance) - Water treatment from biological waste water to clean water production, Membrane bio reactors.

### **Books Recommended:**

1. Applied Chemistry: Dr. Avinash V. Bharati, Dr. (Mrs.) Seema A. Shrivastava, Dr. (Mrs.) Seema G. Rawat, Dr. Indrani B. Das Sarma, Dr. (Mrs.) Jyoti N. Thakre, Dr. Kiran M. Khandalkar. Published by Das GanuPrakashan, Nagpur (India)
2. Text Book of Engineering Chemistry: S.S. Dara, S. S. Umare, Published by S. Chand and Company Ltd. New Delhi
3. Textbook of Engineering Chemistry P.C. Jain and Monica Jain, Published by DhanpatRai and Sons, New Delhi.

### **Reference Books:**

1. A textbook of Engineering Chemistry by RajashreeKhare, Published by S. K. Katariya and sons
2. University Chemistry, by B. H. Mahan.
3. Organic Chemistry by Paula Y. Bruice, Published by Pearson
4. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane
5. Fundamentals of Molecular Spectroscopy, by C. N. BanwellIndia.



**RTMNU, Nagpur**  
**SYLLABUS FOR FIRST YEAR (SEMESTER II) BACHELOR OF TECHNOLOGY**  
**(For All Branches)**

<b>Course Code</b>	<b>BSE2--3T</b>			
<b>Course Title</b>	<b>APPLIED CHEMISTRY</b>			
<b>Scheme &amp; Credits</b>	<b>L</b>	<b>T/A</b>	<b>Credits</b>	<b>Semester II</b>
	<b>3</b>	<b>2</b>	<b>4</b>	

<b>Examination Scheme</b>	
<b>T(U): 70 Marks T (1) 30 Marks</b>	<b>Duration of University Exam. : 03 Hours</b>

**Course Objectives.**

- 1) To acquaint the students with the basic concepts of Chemistry, and their applications in the Engineering field.
- 2) To gain the knowledge on properties of materials, and protection of materials from corrosion.
- 3) To impart basic knowledge related to ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- 4) To provide an insight into Green Chemistry and its applications in engineering fields.
- 5) To enable the student to upgrade the existing knowledge of water technologies and to enhance the thinking capabilities in line with the modern trends in Engineering and technology.

**Course Outcomes**

The course will enable the students to

CO1. Rationalize the periodic properties and analyze the Microscopic Chemistry in terms of atomic and molecular orbital.

CO2. Rationalize bulk properties and processes using thermodynamic processes & understand the causes of corrosion, its consequences and methods to minimize corrosion.

CO3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

CO4. Apply the principles of green chemistry in designing alternative reaction methodologies to minimize hazards and environmental degradation.

CO5. Know about treatment of water and its applications in industry.

**UNIT-1: Periodic Properties and Atomic, Molecular Structure**

**( 8 Hours) (Marks 14)**

- Periodic properties :- Effective Nuclear charge, electronegativity and polarizability
- Numerical on Slater's Rule
- Atomic, molecular structure:- Atomic and Molecular orbitals. Molecular Orbital Theory and Energy level diagrams of homo diatomic molecules (Hydrogen to Fluorine) and hetero diatomic molecules, NO, NO<sup>+</sup>, NO<sup>-</sup> and HF.
- Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties (tetrahedral and Octahedral complexes).

**UNIT-2 Thermodynamic & Corrosion**

**(8 Hours) (Marks 14)**

- Definition & basic equation of internal energy and enthalpy
- Numerical on internal energy, enthalpy change (Hess's Law)
- Second law of Thermodynamics, reversible and irreversible reactions
- Role or use of Gibbs free energy in a) chemical equilibrium, b) oxidation reduction
- Corrosion- Definition, Causes, theories of corrosion- dry, wet and differential aeration

## Scope of the syllabus

### Second Semester: Advanced Engineering Materials

#### **Unit - 1: Band theory of solids**

Free electron theory in metals; Derivation for expression of conductivity of a metal, drift velocity, Band theory of solids, Energy Bands, Energy Gap, classification of solids, Fermi function and its variation with temperature; Detailed discussion of relative positions of conduction band and valence band in conductor, insulator and semiconductor.

Concept of effective mass, Semiconductors: Intrinsic and Extrinsic Semiconductors, conduction process in Semiconductors, Energy band diagrams of Intrinsic and Extrinsic Semiconductors at  $T=0K$  and  $T>0K$ , expression for fermi energy in Intrinsic Semiconductors without derivation,.

#### **Unit-2: Semiconductor Devices**

P-N junction Diode, Unbiased, forward biased & reversed biased mode, Transistor action, Hall effect, Hall Coefficient, Characteristics of Tunnel Diode, Zener Diode, LED, Photodiode

#### **Unit 3: Magnetic and Superconducting Materials**

Introduction to magnetic materials, magnetic field, magnetic dipole moment, magnetic induction, magnetization, magnetic susceptibility, magnetic permeability, classification of magnetic materials (diamagnetic, paramagnetic, ferromagnetic), domain hypothesis, B-H curve, antiferromagnetic, ferrimagnetism, Applications: Alnico and magnetic storage

Introduction to superconductivity: Zero electrical resistance, Persistent current Effect of Temperature, Effect of Magnetic Field, Critical Current; The Meissner Effect, Type-I and type-II superconductors, London Equation: The penetration depth, Bardeen-Cooper-Schrieffer (BCS) theory.

#### **Unit 4: Lasers**

Meaning of coherence length of laser, expression for coherence length and coherence time, Laser Emission, Lasing action, optical resonant cavity: Construction and its role in LASERS, three and four level pumping scheme, Laser characteristics: Directionality, Divergence, Intensity, Coherence, Monochromaticity.

#### **Unit 5: Nanoscience and Nanomaterials**

Introduction to nanoscience, Classification of nano materials, Types of Synthesis of Nanomaterials, Reasons for drastic changes in properties at nanoscale, Comparison of properties of nanomaterials with bulk materials, Some special nanomaterials: 1) Zeolites, 2) Graphene, Applications of nanomaterials in engineering.

## **B. E. Semester II    Advanced Engineering Materials (Practical)**

**(Total Credits: 1)**

### **Teaching scheme**

**Lectures: 2 hrs/Week**

### **Examination Scheme**

**P(I): 25 Marks    P(U) : 25 Marks**

### **List of Experiments**

1. Energy gap of semiconductor /thermistor
2. Parameter extraction from V-I characteristics of PN junction diode.
3. Parameter extraction from V-I characteristics of Zener diode.
4. Parameter extraction from V-I characteristics of PNP/NPN transistor in CB and CE mode.
5. V-I Characteristics of Tunnel diode.
6. V-I Characteristics of Light Emitting Diodes.
7. Study of Diode rectification.
8. Study of Hall Effect and determination of Hall Voltage of given sample.
9. Variation of Hall coefficient ( $R_H$ ) with temperature.
10. To study B-H curve and to find out the values of coercivity, retentivity and saturation magnetisation of experimental material.
11. Laser source: Determination of wavelength by diffraction grating.

**Note:** Performance of at least **six** experiments is compulsory in a semester.

## List of Activities

1. Study of band gap of various semiconducting materials.
2. Variation of Fermi energy with respect to various parameters.
3. Identification of N-type & P-type semiconductor on virtual lab.
4. Testing of resistor, transistor, diode, capacitor with the help of multimeter / CRO.
5. Compare Cut-in-voltages of various LEDs.
6. Study of lines of force using bar magnet & iron fillings.
7. Gather information about Maglev train.
8. Write up on History of superconductivity.
9. Study of application of superconductor.
10. Measure the divergence of various sources of light such as torch, laser, tubelight, etc.
11. Understanding the phenomenon of stimulated emission, absorption & stimulated emission.
12. Laser applications in day to day life.
13. Collect information about Holography.
14. Write short note on Discovery of nano materials
15. Applications of nano materials.
16. Industrial Visit

**Note : Performance of at least one activities is compulsory in a semester.**

## Course Outcomes

### Students will be able to

- CO1. Learn the concept of formation of energy bands and to classify solids on its basis.
- CO2. Identify and explain different types of diodes, transistors and its applications
- CO3. Learn the concepts of magnetism and superconductivity, classify and analyze various types of magnetic and superconducting materials.
- CO4. Learn and explain quantum transitions and apply it to working of lasers.
- CO5. Learn the concept of nano materials and compare its properties with those of bulk materials.

### Suggested Text Books &Reference Books

1. *Solid state Physics*, S. O. Pillai, New Age publications.
2. *Charles Kittel, Introduction to Solid State Physics*, Wiley Eastern, 5th edition,(1983).
3. *A.J. Dekker Electrical Engineering Materials*, Prentice Hall of India(1971).
4. *Fundamentals of Physics* by D. Halliday, R. Resnick and J. Walker, John Wiley and Sons Inc.
5. *K. Thyagarajan and A. K. Ghatak, Lasers Theory and Applications*, Mcmillan(1981).
6. *A textbook of Engineering Physics*, Dr. M. N. Avdhanulu, Dr. P. G. Kshirsagar, S. Chand Publication
7. *A text Book of Advanced Engineering Materials*, Dr. D. S. Hardas, , Dr.S.Shastri, Dr. (Mrs)S.P. Wankhede, Dr. D. S. Bhoumik, Dr.(Mrs.)S.U.Bhonsule, Dr.Shruti Patle, , Das Ganu Publication ISBN-978-93-84336-70-7 (2021)
8. *A text Book of Advanced Physics*, Dr. D. S. Hardas, Dr.A. R. Panat , Das Ganu Publication ISBN-978-93-81660-49-2 (2013)
9. *Advanced physical science for Engineers*, Dr. S. Patle, Dr. S. U. Bhonsule, Dr. N. Ugemuge, Dr. S. P. Wankhede, DNA publication
10. *Advanced Engineering Materials*, M. N. Avdhanulu, Shilpa A. Pande, Arti R. Golhar, Mohan Giriya, S. CHAND
11. *W. Saslow, Electricity, Magnetism and light*.
12. *Solid state Physics* by R. L. Singhal, Kedarnath Ramnath & Co.Meerut
13. *Introduction to Lasers Theory and Applications* by M. N. Avadhanulu, S. Chand and Company
14. *Engineering Physics* by P. K. Palaniswamy, Scitech(2005)
15. *Engineering Physics* by H. Malik and A. K. Singh, TMH(2010)
16. *Engineering Physics* by D. K. Bhattacharya and A. Bhaskaran, Oxford University Press (2010)
17. *Materials Science and Engineering- A First course* by V. Raghavan, PHI Learning

## **B.Tech. Semester II Advanced Engineering Materials (Total Credits 3)**

### **Teaching Scheme**

**Lectures: 2 Hours/Week Theory,**

**Tutorial/Activity: 2 Hours/week**

### **Examination Scheme**

**T(U): 70 Marks T(I): 30 Marks**

**Duration of University Exam: 3 Hours**

### **Unit - 1: Band theory of solids (6 Hrs) 14 Marks**

Basic idea of free electron theory of metals, expression of conductivity of a metal. Formation of energy bands in Solids, Fermi energy and Fermi level.

Classification of solids on the basis of energy band diagram: Conductors, Semiconductors and Insulators, concept of Fermi energy.

### **Unit-2: Semiconductor Devices (7 Hrs) 14 Marks**

Types of Semiconductor diodes, P-N junction Diode: Characteristics of P-N junction Diode, Tunnel Diode, Zener Diode, LED, Photodiode.

Transistors . Hall effect, Hall voltage and Hall coefficient; its applications,

### **Unit 3: Magnetic and Superconducting Materials (10 Hrs) 14 Marks**

Diamagnetic, Paramagnetic, Ferromagnetic, Ferri-magnetic and anti ferromagnetic materials: Explanation on the basis of domain. Hysteresis curve, Characteristics of ferromagnetic, diamagnetic and paramagnetic materials and their applications.

Superconductors: Basics of superconductivity: Zero electrical resistance, Persistent current Effect of Temperature, Effect of Magnetic Field, Critical Current; The Meissner Effect. Type-I and type-II superconductors, London Equation: The penetration depth, Bardeen-Cooper-Schrieffer (BCS) theory.

### **Unit 4: Lasers (7 Hrs) 14 Marks**

Quantum Transitions: Absorption, Spontaneous emission & stimulated Emission, Metastable states, Principle of laser, Laser characteristics, Coherence length and coherence time, Pumping schemes: Three level and Four level.

Optical Resonator, Construction & working of Ruby laser and He-Ne laser, Applications of laser.

### **Unit 5: Nanoscience and Nanomaterials (6 Hrs) 14 Marks**

Introduction to Nanoscience, Classification of nano materials, Types of Synthesis of Nanomaterials, Comparison of properties of nanomaterials with bulk materials,

Some special nanomaterials: 1) Zeolites, 2) Graphine, Application of nanomaterials in engineering.

**Unit 3: Vector Calculus****(10 Hours)**

**Vector Calculus:** Vector triple product, Product of four vectors, Scalar point function, Vector point function, Vector differentiation, Gradient, Divergence and Curl, Directional derivatives, Solenoidal and Irrotational motions

**Vector Integration:** Line integrals and Work done.

**Unit 4: Statistics****(6 Hours)**

**Fitting of a Curve by Method of Least Squares:** Straight line  $y = a+bx$ , Second degree parabola  $y = a+bx+cx^2$  and curves of the type  $y = ae^{bx}$ ,  $y = ab^x$  and  $y = ax^b$ , Coefficient of correlation and Lines of regression, Rank correlation.

**Unit 5: Finite Differences****(6 Hours)**

Operators E & Delta, Factorial polynomial, Lagrange's interpolation formula for unequal intervals of arguments.

**Numerical Integration:** Trapezoidal rule, Simpson's 1/3rd rule and Simpson's 3/8th rule, Difference equations with constant coefficients.

**Text/Reference Books:**

- (1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- (2) Ramana B.V., Higher Engineering Mathematics, Tata Mc-Graw Hill, New Delhi, 11th Reprint, 2010.
- (3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- (4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- (5) P. N. Wartikar and J. N. Wartikar, Applied Mathematics, Volume I and II.
- (6) H.K Dass, Rama Verma, Rajnish Verma, V.J. Dagwal, Sajid Anwar and D.F. Shastrakar, Engineering Mathematics, Volume I and II, S. Chand.

**Faculty of Science and Technology**  
**R.T.M Nagpur University, Nagpur**  
**Syllabus for B. Tech. Second Semester**  
**Mathematics – II**

**Total Credits: 4**

**Teaching Scheme**

Lectures: 3 Hours/Week

Tutorial: 1 Hour/Week

**Subject Code: BES2-1**

**Examination Scheme**

Theory T (U): 70 Marks, T (I): 30 Marks

Duration of University Exam: 3 hours

**Course Objectives:**

1. The objective of the course is to inculcate and strengthen analytic ability among the engineering students and to create zeal of working with higher mathematics and its applications in the extensive field of engineering.
2. The topics covered will serve as basic tools for specialized studies in many fields of engineering and technology.

**Course Outcomes:**

After completing the course, students will be able to

1. Analyze real world scenarios to recognize when integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
2. Define and understand the geometry of vector differential operators and line and surface integrals.
3. Explain and apply principles of study design and data collection.
4. Develop an ability to identify, formulate and/or solve real world problems.
5. Understand the impact of scientific and engineering solutions in a global and societal context.

**Unit 1: Integral Calculus**

**(13 Hours)**

**Evaluation of Definite and Improper Integrals:** Beta and Gamma functions and their properties, Differentiation of definite integral, Mean value, Mean square value and Root mean square value.

**Curve Tracing:** Tracing of curves (Cartesian), Applications of definite integrals to find length of curve, area, volume and surface area of solids of revolution (Cartesian, Polar and Parametric curves).

**Unit 2: Multivariable Calculus (Integration)**

**(13 Hours)**

**Multiple Integration:** Double integrals (Cartesian and Polar), Change of order of integration in double integrals, Change of variables (Cartesian to Polar).

**Applications:** Area, Mass, Volume and Center of Gravity (constant and variable densities), Elementary triple integrals.



Wiley and Sons, USA

**Reference Books Recommended:**

1. Pravin Kumar, (2018), "Basic Mechanical Engineering, 2nd Ed.", Pearson (India) Ltd
2. Groover, Mikell P., (1996), "Fundamentals of Modern Manufacturing: Materials, Processes, and Systems", Prentice Hall, USA
3. Khurmi, R.S. and Gupta, J. K., "A Textbook of Thermal Engineering", S. Chand & Sons
4. The National Building Code, BIS, (2017)
5. RERA Act, (2017)
6. Chandiramani, Neelima (2000), The Law of Contract: An Outline, 2nd Edn. Avinash Publications Mumbai
7. Avtarsingh (2002), Law of Contract, Eastern Book Co.
8. Dutt (1994), Indian Contract Act, Eastern Law House
9. Anson W.R. (1979), Law of Contract, Oxford University Press
10. Kwatra G.K. (2005), The Arbitration & Conciliation of Law in India with case law on UNCITRAL Model Law on Arbitration, Indian Council of Arbitration
11. Avtarsingh (2005), Law of Arbitration and Conciliation, Eastern Book Co.
12. Wadhera (2004), Intellectual Property Rights, Universal Law Publishing Co.
13. P. S. Narayan (2000), Intellectual Property Rights, Gogia Law Agency
14. T. Ramappa (2010), Intellectual Property Rights Law in India, Asia Law House
15. Bare text (2005), Right to Information Act
16. O.P. Malhotra, Law of Industrial Disputes, N.M. Tripathi Publishers
17. K.M. Desai (1946), The Industrial Employment (Standing Orders) Act
18. Rustamji R.F., Introduction to the Law of Industrial Disputes, Asia Publishing House
19. Vee, Charles & Skitmore, Martin (2003) Professional Ethics in the Construction Industry, Engineering Construction and Architectural management, Vol.10, Iss. 2, pp 117-127, MCB UPLtd
20. American Society of Civil Engineers (2011) ASCE Code of Ethics – Principles Study and Application
21. Ethics in Engineering- M.W. Martin & R. Schinzinger, McGraw-Hill
22. Engineering Ethics, National Institute for Engineering Ethics, USA
23. www.ieindia.org
24. Engineering ethics: concepts and cases – C. E. Harris, M.S. Pritchard, M.J. Rabins
25. Resisting Bureaucratic Corruption: Alacrity Housing Chennai (Teaching Case Study)
26. -S. Ramakrishna Velamuri -CEIBS
27. CONSTRUCTION CONTRACTS, <http://www.jnormanstark.com/contract.htm>
28. Internet and Business Handbook, Chap 4, CONTRACTS LAW, <http://www.laderapress.com/laderapress/contractslaw1.html>
29. Contract & Agreements <http://www.tco.ac.ir/law/English/agreements/General/Contract%20Law/C.htm>
30. Contracts, <http://206.127.69.152/jgretch/crj/211/ch7.ppt>
31. Business & Personal Law. Chapter 7. "How Contracts Arise", <http://yucaipahigh.com/schristensen/lawweb/lawch7.ppt>
32. Types of Contracts, <http://cmsu2.cmsu.edu/public/classes/rahm/meiners.con.ppt>
33. IV. TYPES OF CONTRACTS AND IMPORTANT PROVISIONS, <http://www.worldbank.org/html/opr/consult/guidetxt/types.html>
34. Contract Types/Pricing Arrangements Guideline- 1.4.G(11/04/02), <http://www.sandia.gov/policy/14g.pd>

*Grivys*  
D. M. V. Grivys

*BR*  
(B. R. Chidey)

*Abdul*

(ORGANISATION OF COURSE) Only for Basic Civil Engineering		
	Module [No. of Lectures Within brackets]	Tutorials/Activity
1	Basic Understanding (1)	Develop a matrix of various disciplines and possible roles for engineers in each
2	History of Civil engineering (1)	Identify 10 ancient monuments and ten modern marvels and list the uniqueness of each
3	Overview of National planning for Construction and Infrastructure Development (1)	Develop a Strategic Plan for Civil Engineering works for next ten years based on past investments and identify one typical on-going mega project in each area
4	Architecture & Town Planning (1)	Identify ten best civil engineering projects with high aesthetic appeal with one possible factor for each; List down the possible systems required for a typical Smart City
5	Building Materials (1)	Identify three top new materials and their potential in Construction
6	Construction Management, Contracts management (1)	Identify 5 typical construction methods and list their advantages/ positive features
7	Environmental Engineering (1)	Write a report on Water Treatment plant and Waste water treatment plant.
8	Geotechnical Engineering (1)	List top five tunnel projects in India and their features; collect and study geotechnical investigation report of any one.
9	Hydraulics, Hydrology & Water Resources Engineering (1)	Identify three river interlinking projects and their Features.
10	Ocean Engineering, Ports & Harbours (1)	Identify 5 typical ports in India and list the structures available in them; Case study report of any one.
11	Power Plant Structures (1)	Collect the typical layout for a large thermal power plant.
12	Structural Engineering (3)	Identify 5 unique features for typical buildings, bridges, tall structures and large span structures; and make a report.
13	Surveying & Geomatics (1)	Identify five location by using Google Earth Map and study.
14	Traffic & transportation (1)	Enlist the NH, SH and their linking and make a report
15	Repairs & rehabilitation of Structures (1)	Identify the major rehabilitation project and make case study report
16	Computational Methods, IT, IoT in Civil Engineering (2)	Visit an AutoCad lab and prepare a report; Identify ten interesting software systems used in Civil Engg and their key
17	Basics of Professionalism (3)	List 5 cases of violation of professional ethics and list preventive measures; Identify 5 interesting projects and their positive features; Write 400 word reports on one ancient monument and a modern marvel of civil engineering
	<b>Total 22 lectures</b>	<b>In 11 Tutorials or any 17 Activity expected</b>

#### References:

##### Text Books Recommended:

1. Patil, B.S.(1974), Legal Aspects of Building and Engineering Contract
2. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
3. Chaudhari and Hajra, "Elements of Workshop Technology", Volume I and II, Media Promoters and Publishers, Mumbai
4. Rai, G.D., (1999), "Nonconventional Energy Sources" Khanna Publisher.
5. Rajput, R.K., (2007), "Basic Mechanical Engineering", Laxmi Publications Pvt. Ltd.
6. Ganeshan, V., (2018), "Internal Combustion Engines". McGraw Hill
7. Agrawal, Basant and Agrawal, C. M., (2008), "Basics of Mechanical Engineering", John

*Handwritten signatures and initials:*  
 - A signature that appears to be "Girish" with "B. S. Rao" written below it.  
 - A signature that appears to be "Raj" with "R. K. Rajput" written below it.  
 - A signature that appears to be "Basant" with "C. M. Agrawal" written below it.

<p>Civil Engineering: Highway design (MX), Building Information Modelling: Highlighting typical available software systems (SAP, STAAD, ABAQUS, MATLAB, ETAB, NASTRAN, NISA, MIKE21, MODFLOW, REVIT, TEKLA, AUTOCAD, ... GEOSTUDIO, EDUSHAKE, MSP, PRIMAVERA, ArcGIS, VisSIM.)</p> <p><b>Basics of Professionalism:</b> Professional Ethics, Entrepreneurial possibilities in Civil Engineering, Possibilities for creative &amp; innovative working, Technical writing Skills enhancement; Facilities Management; Quality &amp; HSE Systems in Construction.</p>	
<p><b>Unit IV :</b></p> <p><b>Introduction to Manufacturing:</b> Conventional Manufacturing Processes: Casting, Forging, Metal forming (Drawing, Extrusion, etc.), Sheet metal working, Metal joining, etc and components produced. Metal cutting processes and machining operations Turning, Milling and Drilling, etc. Additive manufacturing and 3D Printing., Basic CNC programming: Concept of Computer Numerical Controlled machines.</p> <p><b>Engineering Mechanisms and their application in Domestic Appliances:</b> Introduction to Basic mechanisms and equipment: Pumps, blowers, compressors, springs, gears, Belt-Pulley, Chain-Sprocket, valves, levers with its applications in day to day life. Introduction to terms: Specifications, Input, output, efficiency, etc. Applications of: Compressors - Refrigerator, Water cooler, Split AC unit; Pumps - Water pump for overhead tanks, Water filter/Purifier units; Blower - Vacuum cleaner, Kitchen Chimney; Motor - Fans, Exhaust fans, Washing machines.</p>	8
<p><b>Unit V Introduction of energy sources &amp; its conversion</b></p> <p><b>Energy sources:</b> Conventional and Renewable Energy sources, Thermal energy, Power plant, Hydropower energy, Nuclear energy, Solar energy, Geothermal energy, Wind energy, Hydrogen energy, Biomass energy and Tidal energy.</p> <p><b>Energy conversion devices:</b> Introduction of pump, compressor, turbines, wind mills, photovoltaic cells, Two stroke and Four stroke engines (Petrol, Diesel and CNG engines), Steam generators.</p>	8
<p><b>Unit VI:</b></p> <p><b>Vehicles and their Specifications:</b> Classification of automobile. Vehicle specifications of two/three wheeler, light motor vehicles, trucks, buses and multi-axle vehicles. Engine components (Introduction). Study of engine specifications, comparison of specifications of vehicles. Cost analysis of the Vehicle.</p> <p><b>Vehicle systems:</b> Introduction of chassis layouts, steering system, suspension system, braking system, cooling system and fuel injection system and fuel supply system. Study of power transmission system, clutch, gear box, propeller shaft, universal joint, differential gearbox and axles. Vehicle active and passive safety arrangements: seat, seat belts, airbags and antilock brake system. Study of Electric and Hybrid Vehicle systems.</p>	8
<p>Total no of hours</p>	48

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SYLLABUS	
Contents	No of hours
<p><b>Unit-I :</b>  <b>Basic Understanding:</b>            Role of Civil Engineering in Infrastructure development. Current budgets for infrastructure works; Broad disciplines of Civil Engineering; Importance of Civil Engineering. Possible scopes for a career Early constructions and developments over time; Ancient monuments &amp; Modern marvels; Development of various materials of construction and methods of construction; Works of Eminent civil engineers.</p> <p><b>Fundamentals of Architecture &amp; Town Planning:</b> Aesthetics in Civil Engineering, Examples of great architecture, fundamentals of architectural design &amp; town planning; Building Systems (HVAC, Acoustics, Lighting, etc.); LEED ratings; Development of Smart cities</p> <p><b>Fundamentals of Building Materials:</b> Stones, bricks, mortars, Plain, Reinforced&amp;Prestressed Concrete, Construction Chemicals; Structural Steel, High Tensile Steel,Carbon Composites; Plastics in Construction; 3D printing; Recycling of Construction &amp; Demolition wastes</p> <p><b>Basics of Construction Management &amp; Contracts Management:</b> Temporary Structures in Construction; Construction Methods for various types of Structures; Major Construction equipment; Automation &amp; Robotics in Construction; Modern Project management Systems; Importance of Contracts Management</p>	8
<p><b>Unit-II:</b>  <b>Environmental Engineering &amp; Sustainability:</b> Water treatment systems; Effluent treatment systems; Solid waste management; Sustainability in Construction.</p> <p><b>Geotechnical Engineering:</b> Basics of soil mechanics, rock mechanics and geology; various types of foundations; basics of rock mechanics &amp; tunneling.</p> <p><b>Hydraulics, Hydrology &amp; Water Resources Engineering:</b> Fundamentals of fluid flow, basics of water supply systems; Underground Structures; Underground Structures Multi- purpose reservoir projects.</p> <p><b>Structural Engineering:</b> Types of buildings; tall structures; various types of bridges; Water retaining structures; Other structural systems; Experimental Stress Analysis; Wind tunnel studies.</p> <p><b>Surveying &amp; Geomatics:</b> Traditional surveying techniques, Total Stations, Development of Digital Terrain Models; GPS, LIDAR.</p> <p><b>Traffic &amp; Transportation Engineering:</b> Investments in transport infrastructure development in India for different modes of transport; Developments and challenges in integrated transport development in India: road, rail, port and harbour and airport sector; Road Safety under heterogeneous traffic.</p>	8
<p><b>Unit-III:</b>  <b>Repairs &amp; Rehabilitation of Structures:</b> Basics of corrosion phenomena and other structural distress mechanisms; some simple systems of rehabilitation of structures; Non-Destructive testing systems; Use of carbon fibre wrapping and carbon composites in repairs.</p> <p><b>Computational Methods, IT, IoT in Civil Engineering:</b> Typical software used in</p>	8

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RTM Nagpur University  
Syllabus (Theory)

Semester	Course Title (Subject) Code: BSE1-6T	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
B.E. I Sem	Basics of Civil and Mechanical Engineering	4	-	-	0	50		50	

Sr. No.	Course Objective The objective of this course is-
1	To give an understanding to the students of the vast breadth and numerous areas of engagement available in the overall field of Civil Engineering
2	To motivate the student to pursue a career in one of the many areas of Civil Engineering with deep interest and keenness
3	To expose the students to the various avenues available for doing creative and innovative work in this field by showcasing the many monuments and inspiring projects of public utility.
4	To introduce manufacturing processes applying proper method to produce components. To be able to select and compare domestic appliances.
5	To get knowledge about various energy sources and its conversion.
6	To get acquainted with vehicle systems.
Course Outcomes	
After successful completion of this course the student will be able to:	
CO1	Introduction to what constitutes Civil Engineering. Identifying the various areas available to pursue and specialize within the overall field of Civil Engineering. Highlighting the depth of engagement possible within each of these areas.
CO2	Exploration of the various possibilities of a career in this field. Understanding the vast interfaces this field has with the society at large. Providing inspiration for doing creative and innovative work
CO3	Showcasing the many monuments, heritage structures, nationally important infrastructure, and impressive projects to serve as sources of inspiration. Highlighting possibilities for taking up entrepreneurial activities in this field. Providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering
CO4	Discuss several manufacturing processes and identify the suitable process. Explain various types of mechanism and its application
CO5	Describe and compare the conversion of energy from renewable and non-renewable energy sources.
CO6	List down the types of road vehicles and their specifications; Illustrate various basic parts and transmission system of a road vehicle.

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Sr. No	List of practical	No of hours	No of sheet
01	Projection of Straight lines – Simple positions, Minimum 4 problems on Projection of Straight lines: Inclined to both the planes.	2	1
02	Two problems each of Construction of conic section by using various methods. Ellipse, Parabola and Hyperbola, One problem each of Cycloid, Involute, Archimedean Spiral.	2	1
03	Minimum 4 problems on Projection of planes – Perpendicular and oblique planes	2	1
04	Minimum 4 problems on Projection on auxiliary planes( Excluding True shape)	4	1
05	Minimum 4 problems on Projection of Solids : Simple positions, Axis inclined to one plane & parallel to other	4	1
06	Minimum 4 problems on Section of Solids(only one stage) – Prism & Pyramids, Cylinder & Cones, Development of Lateral Surfaces – Prism, Pyramid, Cylinder & Cones	4	1
07	Minimum 4 problems on Isometric View and Minimum 4 problems Projection, Prism, Pyramid Cylinder and Cone, General Object	6	2
	<b>Total</b>	<b>24</b>	<b>08</b>
<b>References:</b> <b>Text Books Recommended:</b> Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication, Anand, India Dhawan, R. K., (2000), "A Textbook Of Engineering Drawing", S. Chand, New Delhi <b>Reference Books Recommended:</b> Jolhe, D. A., (2015), "Engineering Drawing", Tata McGraw Hill, New Delhi Shah P J, (2012) 'Basics of Engineering Graphics' S. Chand, New Delhi P.S. Gill, (2015) "Engineering Drawing", S.K.Kataria and sons.			

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**References:**

**Text Books Recommended:**

Bhatt, N. D. and Panchal, V. M., (2016), "Engineering Drawing", Charotar Publication, Anand, India

Dhawan, R. K., (2000), "A Textbook Of Engineering Drawing", S. Chand, New Delhi

**Reference Books Recommended:**

Jolhe, D. A., (2015), "Engineering Drawing", Tata McGraw Hill, New Delhi

Shah P J, (2012) 'Basics of Engineering Graphics' S. Chand, New Delhi

P.S. Gill, (2015) "Engineering Drawing", S.K.Kataria and sons,

**RTM Nagpur University  
Proposed Syllabus (Practical)**

Semester	Course Title (Subject) <i>Code: BSE1-5P</i>	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
B.E. I Sem	Engineering Graphics lab	-	-	4	2	25	25	50	

Sr. No.	Course Objective The objective of this course is-
1	To acquire basic knowledge about engineering drawing, line types, dimension methods, and simple geometrical construction. To draw conic sections by various methods, involutes, cycloid and spiral.
2	To acquire basic knowledge about physical realization of engineering objects and shall be able to draw its different views. To imagine visualization of lateral development of solids.
3	To visualize three dimensional engineering objects and shall be able to draw their isometric views
<b>Course Outcomes</b>	
After successful completion of this course the student will be able to:	
CO1	Draw the fundamental engineering objects using basic rules and able to construct the lines, simple geometries. Construct the various engineering curves using the drawing instruments.
CO2	Draw two dimensional and three dimensional objects, precisely using drawing equipment.
CO3	Draw the development of lateral surfaces for cut section of geometrical solids precisely using drawing equipment.
CO4	Draw a simple isometric projection from given orthographic views precisely using drawing equipment.

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<p><b>Projections of Points and Lines:</b> Projections of points in all possible positions w.r.t. reference planes. Projections of lines when it is perpendicular to one of the reference planes, when line is inclined to one &amp; parallel to other reference plane. Lines inclined to both reference planes. (Lines in First Quadrant Only) Construction of conic section by using various methods. Ellipse, Parabola and Hyperbola, Engineering Curves: Cycloid, Involute, Archimedean Spiral.</p>	3
<p><b>Unit II:</b> <b>Projection of planes:</b> Types of planes, position of planes parallel to one of the reference planes, Perpendicular to one &amp; inclined to other reference plane. Inclined to both reference planes. Types of Auxiliary Planes, projection on auxiliary planes. (Exclude determination of true shape). <b>Projection of Solids:</b> types of solids, Simple positions, Axis inclined to one plane &amp; parallel to other plane(only two stage)</p>	3
<p><b>Unit III:</b> <b>Section of Solids.</b> (only one stage)– Types of section plane, types of sectional views, true shape of section. Projection of different solids cut by different section plane(when solid is in simple position, i.e. axis perpendicular to one and parallel to other reference plane). <b>Development of Lateral Surfaces:</b> Principle of development, methods of development of lateral surfaces of solids. Development of lateral surface of above cut solids.</p>	3
<p><b>Unit IV:</b> <b>Isometric View and Projection:</b> Definition of isometric projection/view, Isometric scale, isometric lines, planes, non isometric lines/plane. Plane figures. Construction of isometric view from given views of an object. Construction of isometric projection of combined solids ( axes vertical and coinciding) Prism, Pyramid Cylinder and Cone.(Exclude Sphere)</p>	3
<b>Total</b>	<b>12</b>

Sr. No.	List of Tutorials	No of hours
01	Projection of points.	1
02	Projection of Straight lines – Simple positions, Minimum 4 problems on Projection of Straight lines: Inclined to both the planes..	2
03	Two problem each of Construction of conic section by using various methods. Ellipse, Parabola and Hyperbola,	2
04	One problem each of Cycloid, Involute, Archimedean Spiral.	1
05	Projection of planes – Perpendicular and oblique planes	2
06	Projection on auxiliary planes	2
07	Projection of Solids : Simple positions, Axis inclined to one plane & parallel to other	2
08	Section of Solids – Prism & Pyramids ,Cylinder & Cones Development of Lateral Surfaces – Prism, Pyramid, Cylinder & Cones	6
09	Isometric View and Projection – Planes or plane figures ,Prism, Pyramid Cylinder and Cone, General Object	6
<b>Total no of Tutorial</b>		<b>24</b>

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**RTM Nagpur University**  
**Syllabus (Theory)**

Semester	Course Title (Subject) Code: BSE1-5T	Hours / Week			Credits	Maximum Marks			Exam Duration (Hrs.)
		L	T	P		Continual Assessment	University Examination	Total	
B.E. I Sem	Engineering Graphics	1			1	15	35	50	03

Sr. No.	Course Objective The objective of this course is-
1	To acquire basic knowledge about engineering drawing language, line types, dimension methods, and simple geometrical construction. To draw conic sections by various methods, involutes, cycloid and spiral.
2	To acquire basic knowledge about physical realization of engineering objects and shall be able to draw its different views. To imagine visualization of lateral development of solids.
3	To visualize three dimensional engineering objects and shall be able to draw their isometric views
<b>Course Outcomes</b>	
After successful completion of this course the student will be able to:	
CO1	The learner will able to understand the basic knowledge of engineering graphics such as instruments, lines, dimensioning techniques, scales, sheet layout. Construct the various engineering curves using the drawing instruments and basic of orthographic projection through drawing the projection of point and line.
CO2	The learner will able to understand projections of different types planes (2D) and solids (3D) and will be able to draw different views of plane and solids.
CO3	The learner will able to understand concept of sectioning and development of lateral surfaces of solid and will able to represent it.
CO4	Apply the visualization skill to draw a simple isometric projection/view from given orthographic views precisely using drawing equipment

<b>SYLLABUS</b>	
Contents	No of hours
<b>Unit I:</b> <b>Introduction to Engineering Graphics:</b> Introduction to Engineering Graphics, Use of various drawing instruments, Sizes of drawing sheets, different types of lines used in drawing practice. Dimensioning linear, angular, aligned system, unidirectional system, Introduction to scales & scale factor (RF). <b>Basics of Orthographic Projections:</b> Basic principles of orthographic projection, reference planes, concepts of four quadrants, methods of orthographic projections. First angle projections,	3

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## Syllabus of Communication Skills (Practical)

1. Barriers to Communication- Overcoming listening barriers
2. Non-verbal Communication
3. Reading Skills
4. Speaking Skills
5. Presentation Skills
6. Group Discussion
7. Interview Techniques
8. Use of Figurative Language

B. Agrawal  
(Dr. Bhumika Agrawal)

Doralf  
(Dr. Dora Thompson)

Nawaz  
(Dr. Nawaz Khan)

Abid  
(Dr. Sajid Anwar)

Giriyog  
Dr. M. N. Giriyog

Abhinav  
(Arbhat)

BR  
(B.R. Chide)

**Subject: Communication Skills**

Total Credits:01

2020-21, Semester: I

Sub.Code: BSE1-4P

Teaching Scheme

Practical : 2 Hours/ Week Practical

Examination Scheme

P (U) : 25 Marks P(I) : 25 Marks

Duration of University Exam. : 03 Hours

Course Objective: To enhance competency in all the four skills (LSRW) of English language among learners.

Course Outcomes:

1. Students will be able to overcome listening barriers of communication.
2. Students will be able to enhance their comprehending skills and speaking skills.
3. Students will be able to give effective presentations and handle group situations professionally
4. Students will be able to use figurative language in their formal as well as informal communication.

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(Dr. Sajid Anwar)  
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**Syllabus of Communication Skills (Theory)**

**Unit 1:** A. Introduction to Communication, Importance of Communication, Process of Communication, Types of communication- Verbal and Non Verbal

B. Oral and Written Communication, Barriers to Communication and methods to overcome them. (6 hours)

**Unit 2:** A. Listening Skills, Importance of Listening, Types of Listening, Listening Barriers and methods to overcome them .

B. Effective Speaking Skills, Components of Public Speaking, Overcoming stage fear in public speaking, Group Discussion-Process and techniques (6 hours)

**Unit 3:** A. Reading Skills, Importance of Reading, Sources of Reading, Skimming, Scanning, Comprehending passage

B. Writing Skills, Process and Techniques of Composition-Précis, Paragraph, Essay (6 hours)

**Unit 4:** A. Basic Grammar: Tenses and its types, Sentences and its types

B. Transformation of Sentences- Assertive-Imperative-Interrogative-Exclamatory, Reported Speech.(6 hours)

**Books Recommended:**

1. Technical Communication by Meenakshi Raman and Sangeeta Sharma, OUP
2. Public Speaking and Influencing Men in Business by Dale Carnegie
3. Essentials of English Grammar by Micheal Swan
4. Professional Communication Skills by Bhatia and Sheikh
5. Business Communication by K.K. Sinha
6. Communication Skills by Dr. P. Prasad
7. Communication Skills by Sanjeev Kumar and Pushpalata, OUP

B. Agrawal  
(Dr. Bhumnika Agrawal)

Abul  
(Dr. Sajid Anwar)

BR  
(B.R. Chidi)

Dorally  
(Dr. Dora Thompson)

Geeje  
Dr. M.V. Ginyo

Nawaz  
(Dr. Nawaz Khan)

Abul  
(Ar. Bhoadi)

**Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur**

**Subject: Communication Skills**

Total Credits:02

Sub.Code: BSE1-4T

2020-21, Semester: I

Teaching Scheme

Examination Scheme

Lectures: 2 Hours/ Week (Theory)

T (U) : 35 Marks T (I) : 15 Marks

Duration of University Exam. : 02 Hours

**Course Objective: To enhance competency in English language among learners.**

Course Outcomes:

1. Students will be able to overcome barriers of communication.
2. Students will acquire public speaking skills and handle group situations professionally.
3. Students will be able to comprehend passages and compose paragraphs.
4. Students will be able to construct error free and meaningful sentences in English.

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(B. R. Chide)

## ENERGY AND ENVIRONMENT LABORATORY (BESI-3P)

Course Code	BESI-3P				
Course Title	Energy and Environment Lab				
Scheme & Credits	L	T	P	Credits	Semester
	0	0	2	1	I

<b>Examination Scheme</b>	
P (U) : 25 Marks P (I) : 25 Marks	Duration of University Exam. : 03 Hours

### Laboratory outcomes

After completion of this course, the student will develop competencies in

1. The practical knowledge of handling chemicals.
2. Analysing a broad foundation in energy and environment that stresses scientific reasoning and analytical problem solving with a molecular perspective.
3. Experimental techniques using modern instrumentation.

### Students should-

- Perform any six experiments.
- Study of any one experiment in virtual lab topics based on the syllabus.
- Study of any one demonstration experiment.

- 1) Determination of Flash Point of the given sample by Cleveland's open cup apparatus.
- 2) Determination of Flash Point of the given sample by Abels/ Pensky Martens close cup apparatus.
- 3) Determination of Neutralisation number (Acid value) of oil.
- 4) Determination of Viscosity by Redwood Viscometer and specific gravity of Biodiesel at different temperatures.
- 5) To determine Sulphate Concentration in a given water sample.
- 6) Determination of amount of Chloride (in Cl<sup>-</sup> form) by Mohr's method.
- 7) Determination of COD of water sample.
- 8) To determine the Total Solids, Suspended Solids and Total Dissolved Solids of a given water sample.
- 9) Determination of turbidity of given water sample by Nephelometry
- 10). Proximate analysis of coal -Determination of % of Moisture and % of Volatile Matter in coal sample
- 11) Proximate analysis of coal -Determination of % of ash in coal sample
- 12) Demonstration of determination of % carbon by Carbon residue conradson apparatus.
- 13) Demonstration of determination of Consistency of grease by Penetrometer.
- 14) Demonstration (Virtual) of determination of Calorific value of solid/liquid fuels.
- 15) Demonstration (Virtual) of estimation of flue gas by Orsat's apparatus.

### Activities

1. Preparation of Audit Report for Industry waste generation.
2. Survey of greener synthesis of common drugs ( in the form of chart and/or model)
3. Nearby industrial chemicals safety measures
4. Study of Chemical processes involved in nearby industries (Cement, Paper, Electroplating, Water purification industry etc.)
5. Study of separation and recycling techniques of polymers and E-waste.
6. Study of Biogas plant.
7. Study of the production process of biofuels.
8. Study of the biomass briquetting machine.

**UNIT 3:- Alternate Sources of Energy & Waste to Energy Conversion****(8 hours)****(Marks 14)**

- Bio-energy, Photolysis of water- Chemical Conversion of Solar Energy.
- Nuclear fuels: Numerical on Binding Energy & Average Binding Energy per Nucleon
- Fuel cells- working, advantages and disadvantages of alkaline, methanol fuel cells.
- Classification of waste on the basis of segregation at source, hazardous solid waste management technology: Physical method, chemical method, biological treatment, Eco-friendly Incineration, Depolymerization, landfill techniques.
- Utilization of Biogas and Landfill Gas for Biofuels and High Value Chemicals, gasification and Utilization of Syngas, Thermochemical Conversion of Syngas

**UNIT 4:- Environmental impacts of Energy Technologies****(8 Hours)****(14 Marks)**

- Industrial pollution due to non-renewable energy sources: General Introduction of Industrial pollution and its types. Principle, processes, source of pollution.
- Environmental impact and its control with reference to specific industries; like Nitrogen containing fertilizers- ammonia synthesis, Cement manufacturing Industry; Sulfuric acid manufacturing industry and petroleum Industry

**UNIT 5:- Advanced materials for sustainable development****(8 Hours)****(14 Marks)**

- Introduction of Advance materials, properties and applications:- composites, liquid Crystal polymers, conducting polymers, insulating materials, adhesives, biodegradable polymers.
- Nanomaterials in energy- Photochemical devices like lithium ion batteries, Nanomaterials for Energy Storage, nanomaterials in solar cells.

**Books Recommended:**

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. Materials Chemistry: A.V. Bharati and Walekar, Tech Max Publications, Pune.
4. Energy and Environment: Archana R Chaudhari and Aditi Pandet, S. Chand Publication

**Reference Books:**

1. A Text book of Engineering Chemistry: Shashi Chawla; Dhanpat Rai & Sons, New Delhi.
2. Applied Chemistry by N. Krishnamurthy: P. Vallinavagam. And K. Jeysubramanian TMH
3. Applied Chemistry for Engineers: T.S. Gyngell.
4. Fuels and Combustion: Amir Circar, Orient Longmans
5. Fundamentals of Engineering Chemistry (Theory and Practice) :S. K. Singh (New Age Materials)
6. Environmental Chemistry: B. K. Sharma
7. Industrial Energy Management and Utilization: L.C. Witte, P.S. Schmidt and D.R. Brown (Hemisphere Publishing Corporation, Washington, 1998)
8. Energy and Environment- NPTEL lecture notes

**RTMNU, Nagpur**  
**SYLLABUS FOR FIRST YEAR (SEMESTER I & II) BACHELOR OF TECHNOLOGY**  
**(For All Branches)**

<b>Course Code</b>	BESI-3T			
<b>Course Title</b>	Energy and Environment			
<b>Scheme &amp; Credits</b>	<b>L</b>	<b>T/A</b>	<b>Credits</b>	<b>Semester</b>
	<b>2</b>	<b>2</b>	<b>3</b>	<b>I</b>

<b>Examination Scheme</b>	
T (U) : 70 Marks T (I) : 30 Marks	Duration of University Exam. : 03 Hours

**Course objectives**

1. To impart knowledge in the domain of renewable and non-renewable energy sources.
2. To bring out Impact of Energy Technologies on Environment
3. To inculcate knowledge and skills about assessing the energy efficiency of different energy sources and use of advanced materials for sustainable development.

**Course outcomes**

After studying the course it is expected that the students will have/be able to:

- CO-1 Obtain the knowledge of solid and gaseous fuels and their Calorific Value determination.
- CO-2 Recognize the type of liquid fuels and their uses in IC engines.
- CO-3 Apply the knowledge about the use of alternative sources of energy & utilize solid waste as energy source
- CO-4 Analyze the impacts of Industrial pollution and its control.
- CO-5 Develop innovative ideas for use of advanced materials in sustainable development.

**UNIT 1:- Basics of Energy and Solid Fuels**

**(8 Hours)**

**(Marks 14)**

- Basics of Energy - Introduction, sources and types of energy, Units of energy, Thermal Basics of energy -fuels, thermal energy contents of fuel, heat capacity, sensible and latent heat, evaporation, condensation, steam, moist air and humidity & heat transfer.
- Classification of fuels, Calorific Value (HCV & LCV). Determination of Calorific value by Bomb and Boy's Calorimeter.
- Solid Fuels:- Significance of Proximate and Ultimate Analysis of coal,
- Numerical based on Dulong's formula.
- Numerical on Goutal's Formula for Gross Calorific Value based on Proximate Analysis
- Numerical on Calorific Value determination.
- Numerical on GCV & NCV by using relation formula (convert answer in joules or one of the CV given in joules)

**UNIT 2: Liquid and Gaseous Fuels**

**(8 Hours)**

**(Marks 14)**

- Liquid Fuel:-Fractional distillation of crude oil, Catalytic cracking and its advantages
- Knocking in internal combustion petrol and diesel engine, Octane and Cetane number, Knocking and its relationship with structure of fuel, Doping agents,
- Power alcohol, Gasohol, Diesehol, Aviation fuel, Bio-diesel.
- Gaseous Fuel:-CNG, H<sub>2</sub> as specialised fuel
- Combustion Calculations.



## Scope of the syllabus

### B. E. Semester I

### Applied Physics

#### **Unit One: Wave Optics**

Interference in thin films, Interference in wedge shape thin film, characteristics of Newton's rings, Antireflection coating, phase and amplitude condition, derivation of minimum thickness, Advanced applications of interference in thin film, Concept of diffraction, Expression of resolving power of grating.

#### **Unit Two: Quantum Mechanics**

Equations for energy and momentum conservation, Mathematical equation for Compton shift & its interpretation (without derivation). Relative intensities of modified and unmodified wavelengths for high and low atomic number scatterers and its explanation, Free electron cannot absorb a photon (proof), Concept of wave particle duality, Matter waves and de-Broglie relation, Significance of matter waves in microscopic and macroscopic bodies.

Definition of wave function ( $\Psi$ ), Heisenberg Uncertainty Principle; significance and applications, Schrodinger's time dependent and time independent wave equations (only equations), Application of Schrodinger's time independent equation to infinite potential well.

#### **Unit Three: Crystal Structure**

Central idea of periodic spatial arrangement of atoms and molecules, derivation of inter planer spacing and Bragg's Law, Applications of Bragg's Law.

#### **Unit Four: Optical Fibers**

Mechanism of attenuation: Attenuation versus wavelength plot, optical window, outline of mechanism of dispersion, Introduction to light source and detectors.

#### **Unit Five: Electron Optics**

Concept of motion of charged particle in electric and magnetic fields with expression of force, Velocity selector, Bethe's law of electron refraction, electric focusing, Construction & working of Electrostatic lens.

Devices: Cathode Ray Tube, Cathode Ray Oscilloscope and its applications, Block Diagram, Function & working of each block, Bainbridge mass spectrograph.

Cathode ray oscilloscope, Block diagram of CRO, Role of each block, Cathode Ray Tube, Various parts of CRT, Applications of CRO: 1) Measurement of AC voltage, 2) Measurement of DC voltage, 3) Determination of frequency, 4) Phase measurement.

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## **B. Tech. Semester I Applied Physics (Practical) (Total Credits: 1.5)**

### **Teaching Scheme**

**Lectures: 3hrs/Week**

### **Examination Scheme**

**P (I): 25 Marks P (U): 25 Marks**

### **List of Experiments**

1. Interference in thin films: Study of wedge shaped thin film.
2. Radius of curvature of a plano convex lens by Newton's Rings
3. Diffraction due to plane diffraction Grating
4. Determination of principal refractive indices of a prism
5. Determination of Plank's constant by using LEDs.
6. Comparative study of cubic crystal structure (with the help of model)
7. Determination of NA for optical fiber
8. Determination of  $e/m$  of an electron by bar magnet method (Thomson's method)
9. Calibration of Time Base circuit of CRO and determination of frequency of electrical signals
10. Determination of phase of electrical signals using CRO.
11. Determination of AC and DC voltage using CRO.

**Note:** Performance of at least **six** experiments is compulsory in a semester.

**Note : Performance of at least one activities is compulsory in a semester.**

### **Modes of Conducting/ Performing the activities**

1. Quiz
2. Demonstration
3. Seminar
4. Group discussion
5. Assignment
6. Study of business model
7. Case study
8. Model making
9. Industry/research lab visit
10. Technical or research paper writing (for conference)
11. PPT making (Power Point Presentation)
12. Mini project

### **Suggested Text Books &Reference Books**

1. *P. M. Mathews and K. Venkatesan, A Textbook of Quantum Mechanics, Tata Mc Graw Hill (1977).*
2. *J. L. Powell and B. Crasemann, Quantum Mechanics, Narosa Publishing House (1993).*
3. *Charles Kittel, Introduction to Solid State Physics, Wiley Eastern, 5th edition, (1983).*
4. *A. J. Dekker, Solid State Physics, Prentice Hall of India (1971).*
5. *A Textbook of Engineering Physics, Dr. M. N. Avdhanulu, Dr. P. G. Kshirsagar, S. Chand Publication*
6. *Text book of Applied Physics, Dr. D. S. Hardas, Dr. D. S. Bhoumik, Dr.S. Shastri, Das Ganu Publication ISBN-978-93-84336-59-2 (2021)*
7. *Applied Physics, M. N. Avdhanulu, Shilpa A. Pande, Arti R. Golhar, Mohan Giriya, S. CHAND*
8. *A Text Book of Engineering Physics Dr. Devashree Hardas & Dr. Ashish Panat, Das Ganu Publication ISBN-978-81-921757-7-5 (2011)*
9. *Applied Physics, - Dr. (Mrs)S.P. Wankhede, Dr.Shruti Patle, Dr.(Mrs.)S.U.Bhonsule and Dr.N. S. Ugemuge DNA Publication ISBN-978-81-945174-6-7 (2020)*
10. *Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles by R. Eisberg and R. Resnick, Wiley and Sons*
11. *Engineering Physics, second edition, Sanjay Jain, G. Sahasrabudhe, University's Press(India) Pvt. Ltd.(2016)*
12. *D. J. Griffiths, Quantum mechanics, Prentice Hall of India Private Limited, New Delhi*
13. *L. I. Schiff, Quantum Mechanics, TMH Publications*
14. *David Halliday, Robert Resnick, Jearl Walker, Principles of Physics, 10<sup>th</sup> Edition, John Wiley and Sons (2017)*
15. *Advanced physics - Dr.Shruti Patle, Dr.(Mrs.)S.U.Bhonsule, Dr.Ashish N. Bodhaye, Dr.Manohar D.Mehare DNA Publication (2019)*
16. *Engineering Physics - Dr.N. S. Ugemuge, Dr.(Mrs.)S.U.Bhonsule and Dr.Shruti Patle DNA Publication(2019)*

## **Unit 5: Electron Optics (07 Hours) 14 Marks**

Basic idea of motion of charged particle in electric and magnetic fields, Velocity selector, Bethe's law of electron refraction, electric focusing, Construction & working of Electrostatic lens.

Devices: Cathode Ray Tube, Cathode Ray Oscilloscope and its applications, Block Diagram, Function & working of each block, Bainbridge mass spectrograph.

### **Course Outcomes**

Students will be able to

**CO1.** Apply concepts in interference and diffraction to solve relevant numerical problems and to relate to relevant engineering applications

**CO2.** Learn the basic concepts of dual nature of matter and wave packet and apply them to analyze various relevant phenomena and to solve related numerical problems

**CO3.** Recall the basic concepts of crystal structure and apply them in solving numerical problems based on them and in relating to applications for determination of crystal structure.

**CO4.** Relate the basic idea of total internal reflection to the propagation of light in an optical fiber and make use of the fiber concepts to solve numerical problems and relate to applications in engineering

**CO5.** Find how to extend the basic concepts of motion of charged particles in electric magnetic fields to solve numerical problems and to relate to applications in electron optic devices and CRO

### **List of activities**

1. Compilation of information regarding interference in day to day life.
2. Comparative study of interference pattern of Newton's ring using Plano convex lens of different radii.
3. Comparison of diffraction patterns of various obstacles such as razor, coin, knife, etc.
4. Biography of Compton & de-Broglie in any electronic form (ppt./video).
5. Understanding the concept of micro and macro bodies, its identification and phenomenon observable using it with reason.
6. Justification of Heisenberg's Uncertainty Principle using thought experiment.
7. Applications of Heisenberg's Uncertainty Principle to prove electron does not exist in the nucleus.
8. Model making such as voids, planes, Miller Indices, FCC, BCC and SC.
9. Exhibition of variety of crystals in nature or day to day life.
10. Tyndall's demonstration.
11. Total Internal Reflection with the help of glass of water & laser source.
12. Collection of optical fibres to understand the internal structure.
13. Determination of ' $\lambda$ ' for various types of waves using CRO. (square, rectangular, sinusoidal)
14. Verification of  $v = \frac{E}{B}$  using Thomson's experiment.

## **B. Tech. Semester I Applied Physics (Total Credits: 4)**

### **Teaching Scheme**

**Lectures: 3hr/Week,**

**Activity/Tutorial: 2 hr/Week**

### **Examination Scheme**

**T (U): 70 Marks T (I): 30 Marks**

**Duration of University Exam. : 3 Hours**

### **Unit 1: Wave optics (09 Hours) 14 Marks**

Huygen's principle, superposition of waves and interference of light by wavefront splitting and amplitude splitting, Interference in thin films, Interference in Wedge shape thin film, Newton's rings, Anti-reflection coating.

Fraunhofer diffraction from a single slit and a circular aperture, Diffraction grating and its resolving power.

### **Unit 2: Quantum Mechanics (10Hours) 14 Marks**

Planck's Hypothesis, Properties of Photons, Compton Effect: Equations for energy and momentum conservation, Expression for Compton shift & its interpretation. Concept of wave-particle duality, de-Broglie Hypothesis, Matter Waves, Davisson-Germer Experiment; Bohr's Quantization condition.

Wave function  $\Psi$  and normalization condition, concept of wave packets, Heisenberg Uncertainty Principle. Schrodinger wave equation (time dependent and time independent), Application to one dimensional infinite potential well.

### **Unit 3: Crystal Structure (08 Hours) 14 Marks**

Crystal structure, Meaning of lattice and basis, Unit cell: primitive and non primitive unit cell; Cubic crystal structure: Simple, Body and Face centered cubic structures, Unit cell characteristics: Effective number of atoms per unit cell, atomic radius, nearest neighbor distance, coordination number, atomic packing fraction, void space, density.

Crystal planes and Miller indices, Inter-planar distance and its co-relation with Miller indices and lattice parameter, Bragg's law of X-ray diffraction.

### **Unit 4: Optical Fiber (08 Hours) 14 Marks**

Optical fibers: Propagation by total internal reflection, structure and classification (based on material, refractive index and number of modes), Modes of propagation in fiber, Acceptance angle, Numerical aperture, Attenuation and dispersion.

Light sources and Detectors, Applications of optical fiber as Sensors - i) Temperature Sensor ii) Pollution / Smoke detector iii) Liquid level sensor, Fiber optic communication system.

**Unit 4: First Order Ordinary Differential Equations (8 Hours)**

Linear, Reducible to linear and Bernoulli's differential equations, Exact differential equations (excluding the cases of integrating factors), Equations of first order and higher degree: Solvable for p, Solvable for y, Solvable for x and Clairaut's type, Application of first order differential equation to simple electrical circuits.

**Unit 5: Higher Order Ordinary Differential Equations (12 Hours)**

Higher order ordinary linear differential equations with constant coefficients, Method of variation of parameters, Cauchy's and Legendre's homogeneous differential equations, Simultaneous differential equations, Equations of the type  $d^2y/dx^2=f(x)$  and  $d^2y/dx^2=f(y)$ , Applications of higher order differential equations to simple electrical circuits.

**Text/Reference Books:**

- (1) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- (2) Ramana B.V., Higher Engineering Mathematics, Tata Mc-Graw Hill, New Delhi, 11th Reprint, 2010.
- (3) N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
- (4) B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
- (5) P. N. Wartikar and J. N. Wartikar, Applied Mathematics, Volume I and II.
- (6) H.K. Dass, Rama Verma, Rajnish Verma, V.J. Dagwal, Sajid Anwar and D.F. Shastrakar, Engineering Mathematics, Volume I and II, S. Chand.

**Faculty of Science and Technology**  
**R.T.M Nagpur University, Nagpur**  
**Syllabus for B. Tech. First Semester**

**Mathematics – I**

**Total Credits: 4**

**Teaching Scheme**

Lectures: 3 Hours/Week

Tutorial: 1 Hour/Week

**Subject Code: BES1-1**

**Examination Scheme**

Theory T (U): 70 Marks, T (I): 30 Marks

Duration of University Exam: 3 hours

**Course Objectives:**

1. The topics covered will equip them the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power.
2. The aim is to inculcate and develop the basic mathematics skills of engineering students that are imperative for effective understanding of engineering subjects.

**Course Outcomes:**

After completing the course, students will be able to

1. Analyze real world scenarios to recognize when derivatives or integrals are appropriate, formulate problems about the scenarios, creatively model these scenarios (using technology, if appropriate) in order to solve the problems using multiple approaches, judge if the results are reasonable, and then interpret and clearly communicate the results.
2. Appreciate ODE and system of ODEs concepts that are encountered in the real world, understand and be able to communicate the underlying mathematics involved to help another person gain insight into the situation.
3. Apply knowledge of mathematics, physics and modern computing tools to scientific and engineering problems.
4. Develop an ability to identify, formulate and/or solve real world problems.
5. Understand the impact of scientific and engineering solutions in a global and societal context.

**Unit 1: Differential Calculus**

**(8 Hours)**

Successive differentiation: Leibnitz's Rule, Taylor's and Maclaurin's series for function of one variable, Indeterminate forms and L'Hospital's Rule, Maxima and Minima for function of one variable.

**Unit 2: Multivariable Calculus (Differentiation)**

**(12 Hours)**

Functions of several variables, First and Higher order partial derivatives, Euler's theorem, Chain rule and Total differential coefficient, Jacobians, Taylor's and Maclaurin's series for function of two variables, Maxima and Minima for function of two variables, Lagrange's method of undetermined multipliers.

**Unit 3: Matrices**

**(8 Hours)**

Inverse of a matrix by Partitioning method, Rank of a matrix, Consistency of linear system of non-homogeneous equations, Homogeneous system of Linear equations, Symmetric, Skew-symmetric and Orthogonal matrices, Linear and Orthogonal transformations, Cayley-Hamilton theorem.



**RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR**

(Established by Government of Central Provinces Education Department by Notification No. 513, dated 1<sup>st</sup> of August, 1923 & presently a State University governed by Maharashtra Public Universities Act, 2016 (Maharashtra, Act No VI of 2017)  
(Academic Section)

Academic Section, Rashtrasant Tukadoji Maharaj Nagpur University, Jammalal Bajaj Administrative Building, Mahatma Jotiba Phule Educational Premises, Campus Square to Ambazari T-Point Road, Nagpur-440033

No. Acad./Acad. Cale./2022/312-

Date: 10<sup>th</sup> June, 2022

**NOTIFICATION**

It is notified for general information of all the University conducted/ constituent/ affiliated colleges and Post-Graduate Teaching Departments of the University that the Academic Calendar for the session 2022-23 will be as under:

**A) ACADEMIC CALENDAR FOR THE COURSES CONDUCTED AS PER SEMESTER PATTERN FOR SESSION 2022-23.**

**1. Terms & Vacation**

First Term (Odd semesters)	:	23.06.2022 to 18.11.2022
Diwali Holidays	:	20.10.2022 to 29.10.2022
Winter Vacation	:	19.11.2022 to 07.12.2022
Second Term (Even semesters)	:	08.12.2022 to 30.04.2023
Summer Vacation	:	01.05.2023 to 15.06.2023

**2. Admissions\***

a) Last date of Admission (First term odd sem)	:	1 <sup>st</sup> August, 2022
b) Last date for Admission with prior permission of the Vice-Chancellor	:	1 <sup>st</sup> September, 2022

**3. Last date of submission of Enrolment forms to the university** : Within fifteen days from the last notified date of Admission

**4. Examination**

**A. Winter Examinations.**

**1. Commencement of Exam.**

a) Failure Students in even semesters	:	03.10.2022
b) Regular students in odd semesters	:	21.11.2022

**2. Last date for receipt of exams. forms**

a) Regular students	:	31.08.2022 (for admission other than 1st year)
b) Old Ex-Students	:	16.05.2022
c) Ex-Students of immediately previous examination	:	Within 15 days from the date of declaration of the result of summer Exams.

**B. Summer Exams.**

**1. Commencement of Exams.**

a) Failure of odd semester	:	15.03.2023
b) Regular Even semester	:	22.03.2023

**2. Last date for receipt of examinations forms**

a) Regular Students	:	15.02.2023
b) Old Ex-Students	:	15.12.2022
c) Ex-Students of immediately previous exam	:	Within 15 days from the date of declaration of the result of winter Exams.

**5. Declaration of Results** : As per governing provisions of the Act.

**B) ACADEMIC CALENDAR FOR THE COURSES CONDUCTED AS PER ANNUAL PATTERN FOR SESSION 2022-23.**

**1. Terms & Vacation**

First Term	:	23.06.2022 to 18.11.2022
Diwali Holidays	:	20.10.2022 to 29.10.2022
Second Term	:	08.12.2022 to 30.04.2023
Summer Vacation	:	01.05.2023 to 15.06.2023
Winter Vacation	:	19.11.2022 to 07.12.2022



  
PRINCIPAL  
Shri Shankarprasad Anandholi  
College of Engineering, WARDHA

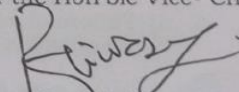


2. Admissions\*
- a) Last date of Admission : 1<sup>st</sup> August, 2022
- b) Last date for Admission with prior Permission of the Vice-Chancellor : 1<sup>st</sup> September, 2022
3. Last date of submission of Enrolment forms to the university : Within fifteen days from the last notified date of Admission.
6. Examination
- Winter Examinations.
1. Commencement of Exam. : 03.10.2022
2. Last date for receipt of exams. forms
- a) Old Ex-Students : 16.08.2022
- b) Ex-Students of immediately previous examination : Within 15 days from the date of declaration of the result of summer exam
- Summer Exams.
1. Commencement of Exams. : 22.03.2023
2. Last date for receipt of exams. forms
- a) Regular Students : 15.02.2023
- b) Old Ex-Students : 15.12.2022
- c) Ex-Students of immediately previous exam. : Within 15 days from the date of declaration of the result of winter exam
5. Declaration of Results : As per governing provisions of the Act.
- C) Convocation Winter 2021 & Summer 2022 : December 2022

**Special Instructions :**

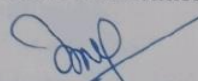
1. The Principals/Heads of the institutions should communicate the list of students admitted in their colleges/ institutions to the university within 15 days from the last date of admission as notified by the university.
2. Students admitted after the last date as specified above shall not be considered for enrolment in the University and therefore, shall not be permitted to appear at the university examinations.
3. All government & other holidays are calculated on the basis of last year's statistics. It is likely to be same except small variations after the declaration by the Government/authorities. The schedule of such holidays will be separately notified by the university at the beginning of Calendar Year
4. Theory and Practical examinations may be held on Sunday with prior permission and intimation.
5. It is necessary by the Principals/Head of the Department to certify the number of actual teaching days conducted during the academic session.
6. All efforts should be made to achieve more than 180 teaching days in Annual Pattern and 90 days per Semester in Semester Pattern.
7. This schedule is applicable only for the entry level admissions to various courses excluding the courses where admissions are governed by centralized admission process.
8. Therefore, the last date of admissions for all courses where centralized admission process is adopted shall be notified separately.
9. The Last Date of examination forms for CAP round admission will be 15 days from the last date of admissions.
10. In case, Admissions governed by **Conditional Eligibility** the last date for submission of examinations form shall be within fifteen days after declaration of its qualifying examinations provided such students should have been admitted provisionally for its next higher academic session as per Direction No. 27 of 2008 and 6 Of 2010.
11. **Special Note:**  
Owing to the Pandemic situation, there is a possibility that this Academic Calendar may require changes during its course of implementation in accordance with the norms and guidelines issued by the Government and other regulating bodies. In view of this, the Academic Council authorizes Hon'ble Vice-Chancellor to make necessary amendments and modifications in this Academic Calendar.

By Order of the Hon'ble Vice- Chancellor

  
(Dr. Riju Hiwse)  
Registrar

**Copy forwarded for information and necessary action to :-**

1. P.A. to Hon'ble Vice-Chancellor, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
2. P.A. to Hon'ble Pro-Vice-Chancellor, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
3. P.A. to Registrar, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
4. The Principals of all Colleges / Head of the Post- Graduate Teaching Departments of the Rashtrasant Tukadoji Maharaj, Nagpur University, Nagpur.
5. All Officers of the Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
6. The Registrar of All Universities in the Maharashtra State.
7. Dr. Veena Prakash, Information Scientist, University Campus Library, RTMNU, Nagpur
8. The Editor, All local News Papers. They are requested to kindly publish the above Notification in their esteemed News Paper as a News Item.

  
(Dr. Rajendra Utkhede)  
Deputy Registrar (Acad.)(Ad.Ch.)




**INSTITUTE ACADEMIC CALENDER 2022-23**



Jai Mahakali Shikshan Sanstha  
Shri ShankarPrasad Agnihotri College of Engineering, wardha  
ACADEMIC CALENDAR 2022-23  
ODD SEM

Sr. No.	Activities	Date/Duration	Responsible Authorities
1	<b>Odd Term - 2022</b>	05 Sept 2022 13 Jan 2023	----
2	Completion of remaining fees upto	10 Jan 2023	HOD, Class In-charge
3	<b>Republic Day</b>	-----	Institute
4	Parents /teacher meeting	1 <sup>st</sup> week of every month	HOD, Class In-charge
5	Students Grievance redressal cell meeting	1 <sup>st</sup> Week of every month	Principal ,Student Dean
6	Display of Attendance	1 <sup>st</sup> Week of every month	Detention In-charge
7	1 <sup>st</sup> Program for Personality Development	2 <sup>nd</sup> week of Oct	HOD, Class In-charge
8	Project Seminar/Other Activities	2 <sup>nd</sup> week of Oct	Project Incharge
9	Unit Test - I	2 <sup>nd</sup> Week of Oct	Subject Teacher
10	Allotment of Assignment -	2 <sup>nd</sup> Week of every month	Subject Teacher
11	<b>Seminar on Research Paper Writing</b>	-----	HOD, Class In-charge
12	Industrial Visit for Students	4 <sup>th</sup> week of Oct	HOD/Class In-charges
13	Submission of Assignment	4 <sup>th</sup> Week of every month	Subject Teacher
14	<b>International Conference</b>	-----	Institute
15	Alumini Meet and Cultural program	-----	Institute
16	<b>Sessional Examination - I</b>	3 <sup>rd</sup> week of Oct	Sessional In-Charge
17	Display of Marks Sessional - I	25 Oct 2022	Sessional In-Charge
18	Project Seminar/ Other Activities	2 <sup>nd</sup> week of Nov	HOD/Class In-charges
19	workshop	2 <sup>nd</sup> week of Nov	HOD/Class In-charges
20	II <sup>nd</sup> Program for Personality Development	3 <sup>rd</sup> week of Nov	HOD/Class In-charges
21	1st Industry expert lecture/Guest lecture/seminar	4 <sup>th</sup> week of Nov	HOD/Class In-charges
22	<b>Sessional Examination - II</b>	2 <sup>nd</sup> Week of Dec	Sessional In-Charge
23	Display of Marks Sessional - II	3 <sup>rd</sup> Week of Dec	Sessional In-Charge
24	Internal Practicals	1 <sup>st</sup> Week of Jan	Practical In-charge
25	Display of Overall Attendance	10-Jan 2023	Detention In-charge
26	Clearance (for Students of All Sem)	Upto 13 Jan 2023	HOD/Class In-charges
27	External Practical Examination	As Per RTMNU Schedule	Practical In-charge
28	University Theory Examination	As Per RTMNU Schedule	-----

  
**Principal**  
 Dr. G.B. Kothare  
**PRINCIPAL**  
 Shri Shankarprasad Agnihotri  
 College of Engineering, WARDHA



Jai Mahakali Shikshan Sanstha  
Shri Shankar Prasad Agnihotri College of Engineering, Wardha  
ACADEMIC CALENDAR 2022-23  
EVEN SEM

Sr. No.	Activities	Date/Duration	Responsible Authorities
1	Even Term - 2022	23 Jan 2023 - 22 May 2023	-----
2	Completion of remaining fees upto	24 Jan 2023	HOD, Class In-charge
3	Republic Day	26 Jan 2023	Institute
4	Parents /teacher meeting	1 <sup>st</sup> week of every month	HOD, Class In-charge
5	Student Feedback	1 <sup>st</sup> week of every month	HOD
6	Students Grievance redressal cell meeting	1 <sup>st</sup> Week of every month	Principal, Student Dean
7	Display of Attendance	1 <sup>st</sup> Week of every month	Detention In-charge
8	1 <sup>st</sup> Program for Personality Development	2 <sup>nd</sup> week of Feb	HOD, Class In-charge
9	Project Seminar	2 <sup>nd</sup> week of Feb	Project Incharge
10	Unit Test - I	2 <sup>nd</sup> Week of Feb	Subject Teacher
11	Allotment of Assignment	2 <sup>nd</sup> Week of every month	Subject Teacher
12	Seminar on Research Paper Writing	3 <sup>rd</sup> week of Feb	HOD, Class In-charge
13	Industrial Visit for Students	4 <sup>th</sup> week of Feb	HOD/Class In-charges
14	Submission of Assignment	4 <sup>th</sup> Week of every month	Subject Teacher
15	International Conference	14 -15 March 2023	Institute
16	Alumini Meet and Cultural program	16 March	Institute
17	Sessional Examination - I	4 <sup>th</sup> week of March	Sessional In-Charge
18	Display of Marks Sessional - I	31 March 2023	Sessional In-Charge
19	Project Seminar	2 <sup>nd</sup> week of April	HOD/Class In-charges
20	Women's grievance redressal cell meeting	1 <sup>st</sup> week of April	Chairman of Cell



21	Workshop	2 <sup>nd</sup> week of April	HOD/Class In-charges
22	II <sup>nd</sup> Program for Personality Development	3 <sup>rd</sup> week of April	HOD/Class In-charges
23	1st Industry expert lecture/Guest lecture/seminar	4 <sup>th</sup> week of April	HOD/Class In-charges
24	<b>Sessional Examination - II</b>	2 <sup>nd</sup> Week of May	Sessional In-Charge
25	Internal Practicals	3 <sup>rd</sup> Week of May	Practical In-charge
26	Display of Marks Sessional - II	3 <sup>rd</sup> Week of May	Sessional In-Charge
27	Display of Overall Attendance	25-May 2023	Detention In-charge
28	Clearance (for Students of All Sem)	Upto 31 May 2023	HOD/Class In-charges
29	External Practical Examination	As Per RTMNU Schedule	Practical In-charge
30	University Theory Examination	As Per RTMNU Schedule	-----



**Principal**

**Dr. G. H. Kothare**

Shri Shankarprasad Agni - 1  
College of Engineering, WARDHA

# ALL DEPARTMENT TIME TABLE OF ACADEMIC YEAR 2022-23


**JAI MAHAKALI SHIKSHAN SANSTHA'S**  
**Shri Shankar Prasad Agnihotri College Of Engg. Wardha**  
**Applied Science & Humanities**  
**Academic Year 2022-23**  
**B.Tech. First Semester (Section A)** w.e.f: 1/10/2022


Time/Day	10.30 – 11.30	11.30 – 12.30	12.30 – 12.55	12.55 – 1.55	1.55 – 2.55	2.55 – 3.00	3.00 – 4.00	4.00 – 5.00
MON	E&E (L) [MM]	EG-I (L) [PT]	<b>L U N C H B R E A K</b>	A.PHY/E&E(P) A1/A2 BATCH [HK]/[MM]		<b>S H O R T B R E A K</b>	BC& ME (L) [AH]	A.PHY (L) [HK]
TUE	E&E (L) [MM]	COMM. SKILL (L) (NT)		A.PHY/E&E(P) A2/A1 BATCH [HK]/[MM]			BC& ME (L) [AH]	M-I (L) [SK]
WED	E&E (L) [MM]	A.PHY (L) [HK]		COMM. SKILL (P) [NT]			M-I (L) [SK]	BC& ME (L) [PT]
THUS	E&E (L) [MM]	COMM. SKILL (L) [NT]		E.G-I(P) [PT]			M-I (L) [SK]	A.PHY (P) [HK]
FRI	E&E (T/A) [MM]	A.PHY (T/A) [HK]		E.G-I (P) [PT]			M-I (L) [SK]	BC& ME (L) [PT]
SAT	M-I (L) [SK]	A.PHY (T/A) [HK]		INDUCTION PROGRAMME				


Note – College timing for Saturday is 10:30 am to 2:00 pm

• L – Lecture, P – Practical, T – Tutorial, A – Activity

Mathematics (M-I)	Prof. Swati Kulkarni [SK] (9404167982)
Energy and Environment (E & E)	Prof. Manisha Munjewar [MM](9422386014)
Applied Physics (A.PHY)	Prof. Harish Korde [HK] (9767838868)
Communication skill (CS)	Prof. Nita Thakre [NT](7218277251)
Engg. Graphics (EG - I)	Prof. Poonam Tagde (PT)(7709564797)
Basic Civil and Mechanical Engg (BC&ME)	Prof. Ashwini Hingankar (AH)( 7066468494)

  
 Time Table in charge

  
 H.O.D.

  
 PRINCIPAL  
 Shri Shankarprasad Agnihotri  
 College of Engineering, WARDHA

**First year Sec A (Odd semester)**


**JAI MAHAKALI SHIKSHAN SANSTHA'S**  
**Shri Shankar Prasad Agnihotri Collage Of Engg. Wardha**  
**Applied Science & Humanities**  
**Academic Year 2022-23**  
**B.Tech. First Semester (Section B)** w.e.f: 1/10/2022


Time/Day	10.30 – 11.30	11.30 – 12.30	12.30 – 12.55	12.22 – 1.55	1.55 – 2.55	2.55 – 3.00	3.00 – 4.00	4.00 – 5.00
MON	A.PHY (L) [HK]	E&E (L) [MM]	<b>L U N C H B R E A K</b>	M-I (L) [SK]	COMM. SKILL (L) [NT]	<b>S H O R T B R E A K</b>	E.G-I(P) [PT]	
TUE	E.G-I(P) [PT]			COMM. SKILL (L) (NT)	M-I (L) [SK]		E&E (L) [MM]	A.PHY (P) [HK]
WED	E.G-I (L) [PT]	E&E (L) [MM]		A.PHY/E&E(P) B1/B2 BATCH [HK]/[MM]			A.PHY (L) [HK]	BC& ME (L) [AH]
THUS	BC&ME (L) [PT]	A.PHY (T/A) [HK]		COMM. SKILL (P) [NT]			E&E (T/A) [MM]	M-I (L) [SK]
FRI	M-I (T/A) [SK]			A.PHY/E&E(P) B2/B1 BATCH [HK]/[MM]			E&E (L) [MM]	BC& ME (L) [AH]
SAT	A.PHY (T/A) [HK]	BC& ME (L) [PT]		INDUCTION PROGRAMME				


Note – College timing for Saturday is 10:30 am to 2:00 pm

• L – Lecture, P – Practical, T – Tutorial, A – Activity

Mathematics (AM-I)	Prof. Swati Kulkarni [SK] (9404167982)
Energy and Environment (E & E)	Prof. Manisha Munjewar [MM](9422386014)
Applied Physics (A.PHY)	Prof. Harish Korde [HK] (9767838868)
Communication skill (CS)	Prof. Nita Thakre [NT](7218277251)
Engg. Graphics (EG - I)	Prof. Poonam Tagde (PT)(7709564797)
Basic Civil and Mechanical Engg (BC&ME)	Prof. Ashwini Hingankar (AH)( 7066468494)

  
 Time Table in charge

  
 H.O.D.

  
 PRINCIPAL  
 Shri Shankarprasad Agnihotri  
 College of Engineering, WARDHA

**First year Sec B (Odd semester)**

**Jai Mahakali Shikashan Sansatha's  
Shri Shankarprasad Agnihotri College of Engineering, Wardha  
Department of Applied Science and Humanities  
Academic Year 2022-23  
B.Tech. Second Sem (Section A)**

W.E.F- 10/04/2023

Day	10.30-11.30	11.30-12.30	12.30-12.55	12.55-1.55	1.55-2.55	2.55-3.00	3.00-4.00	4.00-5.00
MON	AEM (TH) [HK]	A.CHEM (TH) [MM]	S H O R T B R E A K	COMP. SKILL (TH) [MAR]	M-II (TH) [SK]	L U N C H B R E A K	WSP[AK]/COMP. SKILL [MAR] (PR) A1/A2 BATCH	
TUE	A.CHEM (TH) [MM]	M-II (TH) [SK]		WSP[AK]/COMP. SKILL [MAR] (PR) A2/A1 BATCH			AEM (TU) [HK]	BEE (TH) [HK]
WED	A.CHEM (TH) [MM]	M-II (TH) [SK]		AEM (TH) [HK]	IC & C (A) [NT]		AEM[HK]/A.CHEM[MM] (PR) A1/A2 BATCH	
THUR	COMP. SKILL (TH) [MAR]	M-II (TH) [SK]		A.CHEM (TU) [MM]	EM (TH) [AH]		AEM[HK]/A.CHEM[MM] (PR) A2/A1 BATCH	
FRI	A.CHEM (TH) [MM]	AEM (TU) [HK]		EM (TH) [AH]	IC & C (A) [NT]		BEE (TH) [HK]	M-II (TU) [SK]
SAT	ACTIVITY			Value Added course				

TH: Theory, TU: Tutorial, PR: Practical, A : Audit  
ABBREVIATION:

Name of Subject	Abbreviation	Name of Faculty with phone no.
Basics of Electrical Engg	(BEE)	Prof. Imran khan (Ik)(9423544007)
Mathematics-II	(M-II)	Prof. Swati Kulkarni [SK] (9404167982)
Applied Chemistry	A.CHEM	Prof. Manisha Munjewar [MM](9422386014)
Advance Engineering Materials	(AEM)	Prof. Harish Korde[HK] (9767838868)
Indian Culture & Constitution	IC&C	Prof. Nita Thakre [NT](9307092091)
Computational skill	Comp. Skill.	Prof. Mamta A. Ramteke[MAR] (9960424664)
Engineering Mechanics	E.M	Prof. Ashvini Hingankar [AH] (9284081524)
Workshop Practices	WSP	Prof. A. Kanaskar[AK](8329435639)

PRINCIPAL  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

H.O.D.

**First year Sec A (Even semester)**

**Jai Mahakali Shikashan Sansatha's  
Shri Shankarprasad Agnihotri College of Engineering, Wardha  
Department of Applied Science and Humanities  
Academic Year 2022-23  
B.Tech. Second Sem (Section B)**

W.E.F- 10/04/2023

Day	10.30-11.30	11.30-12.30	12.30-12.55	12.55-1.55	1.55-2.55	2.55-3.00	3.00-4.00	4.00-5.00
MON	M-II (TH) [SK]	AEM (TH) [HK]	S H O R T B R E A K	A.CHEM (TH) [MM]	COMP. SKILL (TH) [ARG]	L U N C H B R E A K	AEM[HK]/A.CHEM[MM] (PR) B1/B2 BATCH	
TUE	COMP. SKILL (TH) [ARG]	AEM (TH) [HK]		A.CHEM (TH) [MM]	M-II (TH) [SK]		IC & C (A) [NT]	EM (TH) [AH]
WED	M-II (TH) [SK]	EM (TH) [AH]		A.CHEM (TH) [MM]	BEE (TH) [HK]		WSP[AK]/Comp. Skill [ARG] (PR) B1/B2 BATCH	
THUR	M-II (TH) [SK]	A.CHEM (TH) [MM]		AEM (TU) [HK]	BEE (TH) [HK]		WSP[AK]/Comp. Skill [ARG] (PR) B2/B1 BATCH	
FRI	AEM (TU) [HK]	M-II (TH) [SK]		A.CHEM (TU) [MM]	IC & C (A) [NT]		AEM[HK]/A.CHEM[MM] (PR) B2/B1 BATCH	
SAT	ACTIVITY			Value Added course				

TH: Theory, TU: Tutorial, PR: Practical, A: Audit  
ABBREVIATION:

Name of Subject	Abbreviation	Name of Faculty with phone no.
Basics of Electrical Engg	(BEE)	Prof. Imran khan (Ik)(9423544007)
Mathematics-II	(M-II)	Prof. Swati Kulkarni [SK] (9404167982)
Applied Chemistry	A.CHEM	Prof. Manisha Munjewar [MM](9422386014)
Advance Engineering Materials	(AEM)	Prof. Harish Korde[HK] (9767838868)
Indian Culture & Constitution	IC&C	Prof. Nita Thakre [NT](9307092091)
Computational skill	Comp. Skill.	Prof. Asmita Ghongde (9834514279)
Engineering Mechanics	E.M	Prof. Ashvini Hingankar [AH] (9284081524)
Workshop Practices	WSP	Prof. A. Kanaskar[AK](8329435639)

PRINCIPAL  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

H.O.D.

**First year Sec B (Even semester)**

DAY	SEM	10.20-11.20	11.20-12.20	12.20-12.30	12.30-1.30	1.30-2.30	2.30-3.00	3.00-4.00	4.00-5.00
MON	III	MII(PT)	FM-I(SMS)	BREAK	GE(AAH)	BCEBD(SAZ)	LUNCH BREAK	C1-SM(NS) C2-FM-I(AAI)	
	V	RCC(AAH)	IE(SRN)		C1-CEMTE(CT)C2-HE(PP)			C1-CEMTE(SAZ)	ELE-E:ASA(TWP)
	VII	ACS(SAZ)	E&C(TWP)		CML(SMS)	TE-II(SRN)		C1-E&C(KB)C2-ACS(CT)	
TUE	III	BCEBD(SAZ)	SM(VBS)		FM-I(SMS)	GE(AAH)		C2-SM(NS) C1-FM-I(AAI)	
	V	ELE-IE:ACS(SMS)	RCC(AAH)		CEMTE(SAZ)	ELE-E:ASA(TWP)		HE(SRN)	PPLE(NT)
	VII	ACS(SAZ)	E&C(TWP)		C2-E&C(KB)C1-ACS(CT)			TE-II(SRN)	ELE-E:ATE(VBS)
WED	III	FM-I(SMS)	SM(VBS)		MII(PT)	GE(AAH)		ETC(NT)	BCEBD(SAZ)
	V	ELE-E:ASA(TWP)	RCC(AAH)		ELE-IE:ACS(SMS)	PPLE(NT)		C1-ITPS(KB) C2-OB(NT)	
	VII	ACS(SAZ)	TE-II(SRN)		E&C(TWP)	ELE-E:ATE(VBS)		P&S (VBS, SRN, TWP)	
THU	III	MII(PT)	SM(VBS)		GE(AAH)	BCEBD(SAZ)		C1-BCEBD(NS) C2-GE(AAI)	
	V	RCC(AAH)	HE(SRN)		ELE-E:ASA(TWP)	ELE-IE:ACS(SMS)		C2-ITPS(KB) C1-OB(NT)	
	VII	ACS(SAZ)	CML(SMS)		ELE-E:ATE(VBS)	TE-II(SRN)		C1 & C2 :ICS(VBS/SRN)	
FRI	III	MII(PT)	ETC(NT)		GE(AAH)	SM(VBS)		C2-BCEBD(NS) C1-GE(AAI)	
	V	PPLE(NT)	ELE-IE:ACS(SMS)		CEMTE(SAZ)	ELE-E:ASA(TWP)		C1-HE(PP) C2-CEMTE(CT)	
	VII	ACS(SAZ)	ELE-E:ATE(VBS)	TE-II(SRN)	CML(SMS)	P&S (VBS, SRN, TWP)			
SAT	III	MII(PT)	ETC(NT)	FM-I(SMS)	BCEBD(SAZ)				
	V	CEMTE(SAZ)	HE(SRN)	SITE VISIT(TWP/AAI)					
	VII	CML(SMS)	E&C(TWP)						

Head of Department  
Civil Engg.  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

PRINCIPAL  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

Civil Engineering (Odd semester)

DAY	SEM	10.30-11.30	11.30-12.30	12.30-12.55	12.55-1.55	1.55-2.55	2.55-3.00	3.00-4.00	4.00-5.00
MON	IV	EE(SRN)	SUR&GEO(VBS)	LUNCH BREAK	C1-IE(AAI) C2-SUR&GEO(NS)		BREAK	SA(TWP)	TE(SMS)
	VI	E&C(TWP)	WRE(SAZ)		ELE-III(PC)(TWP)	CEM(AH)		Seminars&Other Skill Activities	
	VIII	ELE-II(SMS)	CE&F(AH)		ELE-III-WWT(SRN)	IE(SAZ)		C1-ELE-III(WWT)-(PP) C2-Library Hours	
TUE	IV	TE(SMS)	EE(SRN)		CT(SAZ)	SUR&GEO(VBS)		C2-TE(AAH) C1-SUR&GEO(NS)	
	VI	C1-E&C(KB) C2-CAD(CT)			E&C(TWP)	CEM(AH)		WRE(SAZ)	ELE-III(PC)(TWP)
	VIII	IE(SAZ)	CE&F(AH)		ELE-III-WWT(SRN)	ELE-II(SMS)		C2-ELE-III(WWT)-(PP) C1-Library Hours	
WED	IV	SA(TWP)	TE(SMS)		C2-EE(PP) C1-SA(KB)			SUR&GEO(VBS) EE(SRN)	
	VI	CEM(AH)	ELE-III(PC)(TWP)		WRE(SAZ)	E&C(TWP)		Seminars&Other Skill Activities	
	VIII	IE(SAZ)	ELE-III-WWT(SRN)		ELE-II(SMS)	CE&F(AH)		Projects	
THU	IV	CT(SAZ)	SUR&GEO(VBS)		TE(SMS)	EE(SRN)		C1-MP(CT)C2(A)(KB)	
	VI	C2-E&C(KB) C1-CAD(CT)			E&C(TWP)	OPEN ELE:EE(HK/MM)		WRE(SAZ)	ELE-III(PC)
	VIII	ELE-III-WWT(SRN)	CE&F(AH)		IE(SAZ)	ELE-II(SMS)		Seminars&Other Skill Activities	
FRI	IV	SA(TWP)	SUR&GEO(VBS)		C2-MP(CT)C1-EE(PP)			TE(SMS) CT(SAZ)	
	VI	WRE(SAZ)	OPEN ELE:EE(HK/MM)		CEM(AH)	ELE-III(PC)(TWP)		Library Hours	
	VIII	CE&F(AH)	ELE-III-WWT(SRN)	ELE-II(SMS)	IE(SAZ)	Projects			
SAT	IV	SITE VISIT (AAI/TWP)		SITE VISIT (AAI/TWP)					
	VI								
	VIII								

Head of Department  
Civil Engg.  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

PRINCIPAL  
Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

Civil Engineering (Even semester)

Shri. Shankarprasad Agnihotri College of Engineering Wardha  
Department of Mechanical Engineering  
SESSION 2022-2023

Time	Sem	w.e.f: 25/01/2023						Even Sem IV, VI, VIII	
		10.30-11.30	11.30-12.30	12.30-12.55	12.55-01.55	01.55-02.55	02.55-03.00	03.00-4.00	4.00-5.00
MON	IV	MOM (DRR)	MP (AAK)		FM&HM (UNG)	MS&E (PPT)		FM&HM (PR Lab) (RK)	MP (Practical Lab) (MD)
	VI	OR (PPT)	AC (CK)	L	DOM (DRR) (TU)	AIP (UNG)	B	AIP (PR LAB) (MI) / EC-II (PR Lab) (YP)	
	VIII	IM (AAK)			EC-III (AAK) (TU)			Project (SK) / AIP (PR LAB) (UNG)	
TUE	IV	FM&HM (UNG)	MP (AAK) (TU)		Professional Ethics (NT)	MOM (DRR)		Sports/Yoga/ NSS/ NCC (SN)	
	VI	AC (CK)	EC-II (SSJ) (TU)	U	AIP (UNG)	OR (PPT)	R	AIP (PR LAB) (MI) / EC-II (PR Lab) (YP)	
	VIII	IM (AAK)				RAC (SSJ)		Project (AC) / AIP (PR LAB) (JB)	
WED	IV	MOM (DRR)	Seminar / Other Skill Activity		FM&HM (UNG) (TU)	MP (AAK)		FM&HM (PR Lab) (RK) / MP (Practical Lab) (MD)	
	VI	AIP (UNG)	EC-II (SSJ)	N	DOM (DRR)	OR (PPT)	E	Skill Development (SG) / DOM (PR) (PR)	
	VIII		EC-III (AAK)		IM (AAK)	RAC (SSJ) (TU)		Project	
THUR	IV	MP (AAK)	FM&HM (UNG)		MOM (Practical Lab) (DRR) / Professional Ethics (NT)			Seminar / Other Skill Activity	
	VI	DOM (DRR)	EC-II (SSJ)	C	AC (CK) (TU)	Environment Science (MM)	A	MS&E (PPT)	Seminar / Other Skill Activity
	VIII	RAC (SSJ)	IM (AAK) (TU)			EC-III (AAK)		EC-III (PR) (AAK) / RAC (Practical) (SSJ)	
FRI	IV	MS&E (PPT)	MOM (DRR) (TU)		MS&E (PPT) (Extra)	FM&HM (UNG) (Extra)		MOM (Practical Lab) (DRR) / Professional Ethics (NT)	
	VI	DOM (DRR)	AIP (UNG) (TU)	II	AC (CK)	EC-II (SSJ)	K	Skill Development (SG)	Environment Science (PC)
	VIII	RAC (SSJ)				EC-III (AAK)		EC-III (PR) (AAK) / RAC (Practical) (SSJ)	
SAT	IV	Sports/Yoga/ NSS/ NCC (SK)			MOM (DRR) (Extra)				
	VI	Skill Development (SG) / DOM (PR) (PR)			OR (PPT) (Extra)	EC-II (SSJ) (Extra)			
	VIII	Project (AC) / AIP (PR LAB) (JB)			RAC (Extra)	EC-III (AAK) (Extra)			

Time Table Incharge

HOD



Principal  
Dr. C. B. Kothare  
**PRINCIPAL**  
Shri Shankarprasad Agnihotri  
College of Engineering, Wardha

**Mechanical Engineering (Odd semester)**

Shri. Shankarprasad Agnihotri College of Engineering Wardha  
Department of Mechanical Engineering  
SESSION 2022-2023

Time	Sem	w.e.f: 04/08/2022						ODD Sem- III, V, VII	
		10.30-11.30	11.30-12.30	12.30-12.55	12.55- 1.55	1.55- 2.55	2.55- 3.00	3.00-4.00	4.00-5.00
MON	III	MP (AAK)	AM (PT)		PD Classes (SG)	KOM (DRR)		Machine Drawing & Solid Modeling (AC) / Computer Application & Programming (PR)	
	V	DME (UNG)	AE (SSJ)	L	IT (CK)	EC I (AAK)	B	Performing Art (RK) / IT (P) (MD)	
	VII	DMD (DRR)	AE (SSJ)		IE (DRR)	EC-II (CK)		EC II (P) (YP) / Project & Seminar (P) (MJ)	
TUE	III	MP (AAK)	AM (PT)		KOM (DRR)	ET (SSJ)		Machine Drawing & Solid Modeling (AC) / Computer Application & Programming (PR)	
	V	AE (SSJ)	EC I (AAK)	U	IT (SSJ)	IEM (AAK)	R	Performing Art (RK) / IT (P) (MD)	
	VII	AE (SSJ)	IE (DRR)		CAD (UNG)	DMD (DRR)		EC II (P) (YP) / Project & Seminar (P) (MJ)	
WED	III	KOM (DRR)	MP (AAK)		ET (SSJ)	AM (PT)		Yoga, Sports and NSS Activity (SN & SK) / PPT Presentation & Seminar (JB)	
	V	DME (UNG)	IT (CK)	N	IEM (AAK)	AE (SSJ)	E	Industrial Visit (SG) / DME P) (JB)	
	VII	EC-II (CK)	DMD (DRR)		IE (DRR)	AE (SSJ)		CAD(P) (UNG) / DMD (P) (DRR)	
THUR	III	ET (SSJ)	AM (PT)		MP (P) (AAK)			Yoga, Sports and NSS Activity (SN & SK) / PPT Presentation & Seminar (JB)	
	V	EC I (AAK)	IT (CK)	C	AE (SSJ)	DME (UNG)	A	Industrial Visit (SG) / DME P) (JB)	
	VII	CAD (UNG)	EC-II (AAK)		AE (SSJ)	IE (DRR)		CAD(P) (UNG) / DMD (P) (DRR)	
FRI	III	MP (AAK)	AM (SK)		PD Classes (PC) Yoga, Sports and NSS Activity (SK)			PD Classes (YP) Yoga, Sports and NSS Activity (SN)	
	V	AE (SSJ)	IEM (AAK)	II	EC I (AAK)	IEM (AAK)	K	Performing Art (MJ)	
	VII	AE (SSJ)	DMD (DRR)		IE (DRR)	CAD (UNG)		Project & Seminar (P) (DRR)	
SAT	III	KOM (DRR)	AM (PT)	LUNCH	ET (SSJ)				
	V	DME (UNG)	EC I (AAK)		IEM (AAK)				
	VII	EC-II (AAK)	DMD (DRR)		CAD (UNG)				

Time table Incharge



Principal  
Shri Shankarprasad Agnihotri  
College of Engineering, Wardha

**Mechanical Engineering (Even semester)**





**SHRI SHANKAR PRASAD AGNIHOTRI COLLEGE OF ENGINEERING, WARDHA**  
**MASTER TIME TABLE OF DEPARTMENT**  
**SESSION 2022-23 (ODD SEM)**

Day/ Time		10.15to 11:15	11.15to 12:15	12.15 TO 12.30	12:30 to 1:30	1:30 to 02:30	2.30 TO 3.00	3:00 to 4:00	4:00 to 5:00
MON	3rd SEM	AM(PT)	M&I(VK)	B	NT(IK)	DSD(WR)	R	DSD(PR)(WR)/PM	
	5th SEM	EMW(WR)	ES(ST)		EHDL(VK)	IEED(PM)		ES(PR)ST/AA	
	7th SEM	A DSD(PH)	DSP&A (AA)		DSP&A (AA)	OCOMM (AP)		ADSD(PR)PH/MR	
TUE	3rd SEM	AM(PT)	M&I(VK)	R	NT(IK)	S&S(MR)	E	CECD(PR)SK/SS	
	5th SEM	EMW(WR)	ES(ST)		EHDL(VK)	IEED(PM)		DSP(PR)SS/IK	
	7th SEM	DSP&A (AA)	A DSD(PH)		A DSD(PH) TV(PM)			DSP&A(PR)AA/VK	
WED	3rd SEM	AM(PT)	M&I(VK)	E	NT(IK)	S&S(MR)	C	EW(PR) SK /ST	
	5th SEM	EMW(WR)	ES(ST)		DSP(SS)	IEED(PM)		LIBRARY	
	7th SEM	OCOMM (AP)	A DSD(PH)		MEMS(MR)	MEMS(MR)		TV(PR)SS/WR	
THUS	3rd SEM	AM(PT)	M&I(VK)	A	DSD(WR)	CECD(SK)	E	CECD(SK)	DSD(WR)
	5th SEM	EMW(WR)	ES(ST)		EHDL(VK)	DSP(SS)		EW(PR)AA/MR	
	7th SEM	MEMS(MR)	TV(PM)		TV(PM)	A DSD(PH)		DSP&A (AA)	MEMS(MR)
FRI	3rd SEM	AM(PT)	DSD(WR)	K	CECD(SK)	S&S(MR)	S	PD CLASS	
	5th SEM	EMW(WR)	ES(ST)		EHDL(VK)	IEED(PM)		Project & Seminar(ST)	
	7th SEM	A DSD(PH)	TV(PM)		OCOMM	DSP&A (AA)			
SAT	3rd SEM	AM(PT)	M&I(VK)		CECD(SK)				
	5th SEM	EMW(WR)	ES(ST)		DSP(SS)				
	7th SEM	OCOMM (AP)	MEMS(MR)		TV(PM)	CLASS TEST			

*[Signature]*  
HOD



*[Signature]*  
PRINCIPAL  
Shri Shankar Prasad Agnihotri  
College of Engineering, Wardha

**Electronics & Telecommunication Engineering (Odd semester)**



**SHRI SHANKAR PRASAD AGNIHOTRI COLLEGE OF ENGINEERING, WARDHA**  
**MASTER TIME TABLE OF DEPARTMENT**  
**SESSION 2022-23 (EVEN SEM)**

Day/ Time		10.30 TO 11.30	11.30 TO 12.30	12.30 TO 12.55	12.55 TO 1.55	1.55 TO 2.55	2.55 TO 3	3 TO 4	4 TO 5	
MON	4rd SEM	DSA(PH)	ADC(APL)	B	UHV (APL)	PPS(WR)	BREAK	DSA(PH)	M&A(SS)	
	6th SEM	IE(AA)	CCN(VK)		IOT(P)IK/PH			AWP(SK)	ENE	
	8th SEM	MRE(ST)	CCN(VK)		MRE(P)ST/AA			WMC(MR)	SATCOM	
TUE	4rd SEM	M-IV(PT)	ADC(APL)	R	PPS(PR)WR/PM		E	DSA(PH)	UHV	
	6th SEM	IOT(IK)	CCN(VK)		WSN(PM)			WSN(PM)	AWP(SK)	
	8th SEM	WSN(PM)	CCN(VK)		WMC(MR)	SATCOM(VK)		WSN(PM)	WMC(MR)	
WED	4rd SEM	ADC(APL)	M&A(SS)	A	M&A(PR)SS/SK		K	PPS(WR)	UHV(APL)	
	6th SEM	CCN(VK)	IOT(IK)		WSN(PM)	PPS(PR)WR/PM		WSN(PM)	ENE(SS)	
	8th SEM	CCN(VK)	MRE(ST)		SATCOMM	WMC(MR)		SATCOM(VK)	PD(AA)	
THUS	4rd SEM	M-IV(PT)	DSA(PH)	A	ADC(PR)APL/MR		K	M&A(SS)	M-IV(PT)	
	6th SEM	WSN(PM)	AWP(SK)		ENE(SS)	CCN(VK)		MINI PROJECR		
	8th SEM	WSN(PM)	SATCOM(VK)		MRE(ST)	CCN(VK)		PROJECT		
FRI	4rd SEM	ADC(APL)	UHV(APL)	A	PPS(WR)	M&A(SS)	K	ADC(APL)	M-IV(PT)	
	6th SEM	WSN(PM)	IE(AA)		CCN(P)			MINIPROJECT		
	8th SEM	WSN(PM)	MRE(ST)		CCN(P)			PROJECT		
SAT	4rd SEM	M&A(SS)	DSA(PH)	A			K			
	6th SEM	CCN(VK)	IE(AA)		LIBRARY					
	8th SEM	CCN(VK)	PD(AA)							

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Shri Shankar Prasad Agnihotri  
College of Engineering, Wardha

**Electronics & Telecommunication Engineering (Even semester)**



Day	Sem	10:30 to 11:30	11:30 to 12:30	12:30 to 12:55	12:55 to 1:55	01:55 to 02:55	02:55 to 03:00	03:00 to 04:00	04:00 to 05:00	
MON	7 <sup>th</sup>	LP (VVJ)	TCP/IP (MAR)	R E C E S S	DWM (PRACTICAL) (NBV) / (SD)		R E C E S S	MCOM (DBD)	DWM (NBV)	
	5 <sup>th</sup>	DAA (ARG)	ETC (NVT)		SEPM (DBD)	TCP/IP (CDS)		AI (MAR)	LIBRARY HOUR	
	3 <sup>rd</sup>	CA&DS (NBV)	AM (SSK)		OOP with JAVA (ARG)	EIT (VVJ)		OOP with JAVA (PRACTICAL) (ARG) / (PW)		
TUE	7 <sup>th</sup>	DWM (NBV)	TCP/IP (MAR)		LP (VVJ)	MCOM (DBD)		PROJECT AND SEMINAR (CDS)		
	5 <sup>th</sup>	ETC (NVT)	TCP/IP (CDS)		DAA (PRACTICAL) (ARG) / (MT)			AI (MAR)	VALUE ADDED COURSE (DOT NET, JAVA) (NBV)	
	3 <sup>rd</sup>	OOP with JAVA (ARG)	AM (SSK)		CA&DS (NBV)	UHV (MAR)		EIT (VVJ)	ES (DBD)	
WED	7 <sup>th</sup>	TCP/IP (MAR)	DWM (NBV)		LP (PRACTICAL) (VVJ) / (PS)			MCOM (DBD)	LP (VVJ)	
	5 <sup>th</sup>	DAA (ARG)	ETC (NVT)		SEPM (DBD)	TCP/IP (CDS)		AI (MAR)	LIBRARY HOUR	
	3 <sup>rd</sup>	EIT (VVJ)	AM (SSK)		UHV (MAR)	OOP with JAVA (ARG)		CA&DS (NBV)	OS (CDS)	
THU	7 <sup>th</sup>	MCOM (DBD)	LP (VVJ)		TCP/IP (MAR)	DWM (NBV)		PROJECT AND SEMINAR (VVJ)		
	5 <sup>th</sup>	AI (MAR)	DAA (ARG)		AI (PRACTICAL) (VVJ) / (PA)			SEPM (DBD)	LIBRARY HOUR	
	3 <sup>rd</sup>	CA&DS (NBV)	AM (SSK)		OS (CDS)	OOP with JAVA (ARG)		OS (PRACTICAL) (CDS)		
FRI	7 <sup>th</sup>	DWM (NBV)	MCOM (DBD)	TCP/IP (MAR)	LP (VVJ)	VALUE ADDED COURSE (PYTHON, JAVA) (VVJ)	GD AND SEMINAR (MAR)			
	5 <sup>th</sup>	TCP/IP (CDS)	DAA (ARG)	PROFESSIONAL SKILL LAB (NBV)		YOGA & MEDITATION AUDIT COURSE (SBN)				
	3 <sup>rd</sup>	UHV (MAR)	EIT (VVJ)	OS (CDS)	OOP with JAVA (ARG)	CW-1 LAB (CDS)				
SAT	7 <sup>th</sup>	TCP/IP (MAR)	DWM (NBV)	LP (VVJ)						
	5 <sup>th</sup>	SEPM (DBD)	DAA (ARG)	AI (MAR)						
	3 <sup>rd</sup>	OS (CDS)	AM (SSK)	CA&DS (NBV)						

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Shri Shankarprasad Agnihotri  
College of Engineering, WARDHA

**Computer Science Engineering (Odd semester)**



Day	Sem	10:30 to 11:30	11:30 to 12:30	12:30 to 12:55	12:55 to 1:55	01:55 to 02:55	02:55 to 03:00	03:00 to 04:00	04:00 to 05:00	
MON	8 <sup>th</sup>	DOS (DBD)	ICS (NBV)	R E C E S S	DIS (PRACTICAL) (DBD) / (SD)		R E C E S S	AWSN (CDS)	ICS (NBV)	
	6 <sup>th</sup>	ISE (VVJ)	CD (MAR)		HARDWARE LABORATORIAL (CDS)	CLASS ROOM SEMINAR				
TUE	4 <sup>th</sup>	DSPD (ARG)	DM&GT (SSK)		LP (VVJ)	DIMS (SAR)		DIS (PRACTICAL) (ARG) / (PW)		
	8 <sup>th</sup>	ICS (NBV)	AWSN (CDS)		ICS (PRACTICAL) (NBV) / (PS)			DBS (DBD)	CCC (VVJ)	
WED	6 <sup>th</sup>	TVC (VVJ)	DM&GT (SSK)		CCC (CDS)	DSPD (ARG)		MISH PROJECT (MAR)		
	4 <sup>th</sup>	DSPD (ARG)	DM&GT (SSK)		SP (SAR)	SP (ARG)		DIMS (SAR)	CLASS ROOM SEMINAR	
	8 <sup>th</sup>	AWSN (CDS)	CCC (VVJ)		ICS (NBV)	DBS (DBD)		PROJECT & SEMINAR (MAR)		
THU	6 <sup>th</sup>	DOS (DBD)	CD (MAR)		EIE (VVJ)	ECONOMIC OF IT INDUSTRY (ARG)		CLASS ROOM SEMINAR / VALUE ADDED COURSES (ANDROID, HTML) (SBN)		
	4 <sup>th</sup>	CS (NBV)	DM&GT (SSK)		DIMS (PRACTICAL) (CDS) / (MT)			DSPD (ARG)	CLASS ROOM SEMINAR	
	8 <sup>th</sup>	AWSN (CDS)	ICS (NBV)		CCC (VVJ)	DOS (DBD)		PROJECT & SEMINAR (MAR)		
FRI	6 <sup>th</sup>	ECONOMIC OF IT INDUSTRY (ARG)	CD (MAR)		PS-II (PRACTICAL) (NBV) / (PA)			CCC (CDS)	CLASS ROOM SEMINAR	
	4 <sup>th</sup>	TGC (VVJ)	DSPD (ARG)		DIMS (CDS)	SP (MAR)		CW-2 (PRACTICAL) (VVJ)		
	8 <sup>th</sup>	AWSN (CDS)	CCC (VVJ)	PROJECT & SEMINAR (MAR)		CLASS ROOM SEMINAR / VALUE ADDED COURSE (DATA SCIENCE AND BLOCK CHAIN TECHNOLOGY) (ARG)				
SAT	6 <sup>th</sup>	IPRAUDIT COURSE (NBV)	ECONOMIC OF IT INDUSTRY (ARG)	CD (PRACTICAL) (MAR)		CCC (CDS)	CLASS ROOM SEMINAR			
	4 <sup>th</sup>	DSPD (ARG)	SP (MAR)	CS (NBV)	INTERNSHIP (DBD)	CLASS ROOM SEMINAR				
	8 <sup>th</sup>	ECONOMIC OF IT INDUSTRY (ARG)	IPRAUDIT COURSE (NBV)	CLASS ROOM SEMINAR		CLASS ROOM SEMINAR				
	4 <sup>th</sup>	SP (ARG)	TGC (VVJ)	INTERNSHIP (DBD)						

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College of Engineering, WARDHA

**Computer Science Engineering (Even semester)**

# TEACHING PLAN SAMPLE

JAI MAHAKALI SHIKSHAN SANSTHA'S  
**SHRI SHANKARPRASAD AGNIHOTRI COLLEGE OF ENGINEERING, WARDHA**  
 DEPARTMENT OF MECHANICAL ENGINEERING  
 SESSION 2022-23

## TEACHING PLAN

3rd Year/ VI<sup>th</sup> Sem (B.tech)

NAME OF THE TEACHER:-PROF. D. R. RANGARI

SUBJECT: - DYNAMICS OF MACHINES

SUBJECT COD :- BEME603T

Sr No	Lec No	Topic Code	Topic to be covered	Planned Teaching Dates	Text Book (page NO)	Reference Book NO	URL (NPTEL/Online videos/ppt/e-content )	Application (R&D/ Industry)	Learning Outcome
<b>UNIT-I GYROSCOPIC EFFECTS</b>									
1	1	1.01	Introduction, precession motion, derivation	23/01/2023	T1 (Pg:678-679)	R1 (Pg 517-517)	<a href="https://youtu.be/p075LPq3Eas">https://youtu.be/p075LPq3Eas</a>		Students are able to understand gyroscope
2	2	1.02	Effect of gyroscopic couple on shaft bearings	25/01/2023	T1 (Pg:686-686)	R1 (Pg 495-496)	<a href="https://youtu.be/atoP5_DeTPE">https://youtu.be/atoP5_DeTPE</a>		Students are able to tell effect on bearing
3	3	1.03	Effect of gyroscopic couple on airplane	27/01/2023	T1 (Pg:679-680)	R1 (Pg 518-519)	<a href="https://youtu.be/p075LPq3Eas">https://youtu.be/p075LPq3Eas</a>		Students are able to explain effect on airplane
4	4	1.04	Numerical on effect of gyroscopic couple on airplane	30/01/2023	T1 (Pg:680-680)	R1 (Pg 520-521)	<a href="https://youtu.be/ty9QSiVC2g0">https://youtu.be/ty9QSiVC2g0</a>		Students are able to solve numerical
5	5	1.05	Effect of gyroscopic couple on naval ship	01/02/2023	T1 (Pg:682-682)	R1 (Pg 523-524)	<a href="https://youtu.be/x2Vz_8cpgLo">https://youtu.be/x2Vz_8cpgLo</a>		Students are able to explain effect on ship
6	6	1.06	Numerical effect of gyroscopic couple on naval ship	02/02/2023	T1 (Pg:683-685)	R1 (Pg 524-526)	<a href="https://youtu.be/x2Vz_8cpgLo">https://youtu.be/x2Vz_8cpgLo</a>		Students are able to solve numerical
7	7	1.07	Effect of gyroscopic couple on vehicle stability	03/02/2023	T1 (Pg:692-693)	R1 (Pg 527-528)	<a href="https://youtu.be/FydJulA1oeM">https://youtu.be/FydJulA1oeM</a>		Students are able to explain Gyroscopic effect on vehicles
8	8	1.08	Numerical on effect of gyroscopic couple on vehicle stability	06/02/2023	T1 (Pg:697-698)	R1 (Pg 541-542)	<a href="https://youtu.be/0BYmfDWJ0ug">https://youtu.be/0BYmfDWJ0ug</a>		Students are able to solve numerical
9	9	1.09	Introduction to electronic gyroscopes and its applications in the modern automobiles	08/02/2023	T1 (Pg:682-682)	R1 (Pg 523-524)	<a href="https://youtu.be/xrEwN3Z_oGw">https://youtu.be/xrEwN3Z_oGw</a>		Students are able to understand electronic gyroscope
<b>UNIT – II DYNAMIC FORCE ANALYSIS</b>									
10	10	2.01	Concepts in machine element dynamics D'Alembert principle	09/02/2023	T1 (Pg:486-486)	R1 (Pg 495-496)	<a href="https://youtu.be/fEd9jWPs">https://youtu.be/fEd9jWPs</a>		Students are able to understand concepts



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ATTENDANCE RECORD SAMPLE



Jai Mahakali Shikshan Sanstha's

**SHRI. SHANKARPRASAD AGNIHOTRI  
COLLEGE OF ENGINEERING  
WARDHA**

**ATTENDANCE RECORD**

Session : 2022\_\_\_\_\_ - 2023\_\_\_\_\_

Department of Mechanical Engineering

Name of the Staff Member : Prof P. P. Tagade

Subject: operation Research

Class: B.Tech VI th sem

