



# First Year Scheme & Syllabus (2023 Scheme)

## SCHEME AND SYLLABUS



Mechanical Engineering  
**Stream**

**GLOBAL ACADEMY OF TECHNOLOGY**  
Autonomous institution affiliated to VTU, Belagavi.  
Raja Rajeshwari Nagar, Bengaluru-560098.

**GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)**  
**Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023 – 24)**

**I SEMESTER B.E. (PHYSICS GROUP) – ME Stream (ME/AE)**

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT11C	MATHEMATICS I FOR ME STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23PHY12C	APPLIED PHYSICS FOR ME STREAM (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	ESC	23MEE13	ELEMENTS OF MECHANICAL ENGINEERING	ME	ME	3	0	0	50	50	100	3
4	ESC-1	23ESC14C	INTRODUCTION TO C PROGRAMMING (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
5	ETC-1	23ETC15D/ 23ETC15E	INTRODUCTION TO DRONES / INTRODUCTION TO AUTOMATION & ROBOTICS	AE/ ME	AE/ ME	3	0	0	50	50	100	3
6	AEC	23EGH16	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23KSK17/ 23KBK17	SAMSKRUTIKA KANNADA / BALAKE KANNADA	HUMANITIES	ANY	1	0	0	50	50	100	1
<b>TOTAL</b>						<b>17</b>	<b>2</b>	<b>4</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>20</b>

**Note: ASC- Applied Science Course, ESC- Engineering Science Course, ETC – Emerging Technology Course, PLC – Programming Language Course, HSMC- Humanity, Social Science and Management course, AEC – Ability Enhancement Course.**

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**GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)**  
**Scheme of Teaching and Examination 2023–24 (Effective from the academic year 2023 – 24)**

**I SEMESTER B.E. (CHEMISTRY GROUP) – ME Stream (ME/AE)**

Sl. No	Course and Course Code		Course title	Offering Department	Teaching Department	Teaching Hours / Week			Examination			Credits
						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT11C	MATHEMATICS I FOR ME STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23CHE12C	APPLIED CHEMISTRY FOR ME STREAM (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	ESC-1	23ESC14D	ENGINEERING MECHANICS	ME	ME	3	0	0	50	50	100	3
4	ESC-1	23ESC14C	INTRODUCTION TO C PROGRAMMING (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
5	ESC	23MEG15	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
6	HSMC	23IDT16	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23CIP17	INDIAN CONSTITUTION	HUMANITIES	ANY	1	0	0	50	50	100	1
<b>TOTAL</b>						<b>16</b>	<b>2</b>	<b>6</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>20</b>

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						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT21C	MATHEMATICS II FOR ME STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23PHY22C	APPLIED PHYSICS FOR ME STREAM (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	PLC-2	23PLC23B	INTRODUCTION TO PYTHON PROGRAMMING (INTEGRATED)	ISE	ANY	3	0	2	50	50	100	4
4	ESC	23MEE24	ELEMENTS OF MECHANICAL ENGINEERING	ME	ME	3	0	0	50	50	100	3
5	ETC-2	23ETC25D/ 23ETC25E	INTRODUCTION TO DRONES / INTRODUCTION TO AUTOMATION & ROBOTICS	AE/ ME	AE/ ME	3	0	0	50	50	100	3
6	AEC	23EGH26	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23KSK27/ 23KBK27	SAMSKRUTIKA KANNADA / BALAKE KANNADA	HUMANITIES	ANY	1	0	0	50	50	100	1
<b>TOTAL</b>						<b>17</b>	<b>2</b>	<b>4</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>20</b>

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**II SEMESTER B.E. (CHEMISTRY GROUP) – ME Stream (ME/AE)**

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						Theory Lecture	Tutorial	Practical / Drawing	CIE Marks	SEE Marks	Total Marks	
						L	T	P				
1	ASC	23MAT21C	MATHEMATICS II FOR ME STREAM	MAT	MAT	3	2	0	50	50	100	4
2	ASC	23CHE22C	APPLIED CHEMISTRY FOR ME STREAM (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	PLC-2	23PLC23B	INTRODUCTION TO PYTHON PROGRAMMING (INTEGRATED)	ISE	ANY	3	0	2	50	50	100	4
4	ESC-2	23ESC24D	ENGINEERING MECHANICS	ME	ME	3	0	0	50	50	100	3
5	ESC	23MEG25	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
6	HSMC	23IDT26	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	23CIP27	INDIAN CONSTITUTION	HUMANITIES	ANY	1	0	0	50	50	100	1
<b>TOTAL</b>						<b>16</b>	<b>2</b>	<b>6</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>20</b>

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Engineering Science Courses (ESC-1 / ESC-2)					Credits	Emerging Technology Courses (ETC-1 / ETC-2)					Credits
Code	Title	L	T	P		Code	Course Title	L	T	P	
23ESC14A/24A	INTRODUCTION TO ELECTRONICS AND COMMUNICATION	3	0	0	3	23ETC15A/25A	INTRODUCTION TO AI	3	0	0	3
23ESC14B/24B	INTRODUCTION TO ELECTRICAL ENGINEERING	3	0	0	3	23ETC15B/25B	INTRODUCTION TO EMBEDDED SYSTEM	3	0	0	3
23ESC14C	INTRODUCTION TO C PROGRAMMING (INTEGRATED)	3	0	2	4	23ETC15C/25C	RENEWABLE ENERGY SOURCES	3	0	0	3
23ESC14D/24D	ENGINEERING MECHANICS	3	0	0	3	23ETC15D/25D	INTRODUCTION TO DRONES	3	0	0	3
						23ETC15E/25E	INTRODUCTION TO AUTOMATION & ROBOTICS	3	0	0	3
						23ETC15F/25F	WASTE MANAGEMENT	3	0	0	3
Programming Language Courses (PLC-1 / PLC-2)					Credits						
Code	Title	L	T	P		Code	Course Title	L	T	P	Credits
23PLC23A	ADVANCED PROGRAMMING IN C (INTEGRATED)	3	0	2	4						
23PLC23B	INTRODUCTION TO PYTHON PROGRAMMING (INTEGRATED)	3	0	2	4						

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# III - VIII Semester Scheme (2023) Department of MECHANICAL ENGINEERING

## SCHEME



Department of  
MECHANICAL ENGINEERING

**GLOBAL ACADEMY OF TECHNOLOGY**  
(Autonomous institution affiliated to VTU,  
Belagavi.

Accredited by NAAC with 'A' grade,  
NBA Accredited CS, E&C, E&E, MECH and IS  
branches)

IDEAL HOMES TOWNSHIP,  
RAJA RAJESHWARI NAGAR,  
BENGALURU - 560098

Head of Department  
Mechanical Engineering  
Global Academy of Technology  
Bangalore - 98

*H. P. Rajashekar Swar*  
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Global Academy of Technology,  
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# Global Academy of Technology – An Overview

(Autonomous Institution under Visvesvaraya Technological University, Belagavi)

## **Vision of the Institute:**

Become a premier institution imparting quality education in engineering and management to meet the changing needs of society.

## **Mission of the Institute:**

- ❖ Create environment conducive for continuous learning through quality teaching and learning processes supported by modern infrastructure.
- ❖ Promote Research and Innovation through collaboration with industries.
- ❖ Inculcate ethical values and environmental consciousness through holistic education programs.

## **Objectives:**

With a very firm resolve, Global Academy of Technology is continuously investing untiring efforts to enable students to:

- ❖ Develop careers in Government and Private engineering organizations and other professionally related domains.
- ❖ Pursue higher studies and research to develop innovative solutions and technologies in engineering and other multi-disciplinary areas.
- ❖ Improve professional and personal traits oriented towards professional ethics and environmental compulsions.
- ❖ Inculcate professional leadership and successful entrepreneurship qualities.
- ❖ Help society in raising the quality of life.

## **Quality Policies:**

- a. Providing Excellent Education Through High Quality, Experienced and Committed Faculty.
- b. Evolving creative processes for optimal Knowledge and Skill Transfer.
- c. Building up state-of-the-art infrastructure at par with international standards.
- d. Creating an environment for holistic personality development and develop research temperament.

## **HALLMARKS OF GLOBAL ACADEMY OF TECHNOLOGY:**

- ❖ Proactive management determined to build the institute as a Centre of Excellence in engineering education.
- ❖ Qualified and dedicated faculty in all the departments.
- ❖ State of the art Infrastructure and up to date laboratory and Library facilities.
- ❖ Lush green campus with an environment of tranquillity and harmony.
- ❖ Student centric teaching-learning processes banking on Outcome Based Education; students friendly learning atmosphere.
- ❖ Emphasis on Project based learning throughout the course.

- ❖ Strong Industry-Institute interface with more than twenty Memorandum of Understanding (MOUs) signed with leading industries and institutions of repute.
- ❖ Indian Institute of Information Technology (IIIT), Allahabad, has signed a MOU for providing internships to students of GAT, research assistance to faculty, and conducting Faculty Development Programs in key areas of IT - Big Data, Cloud Computing, Artificial Intelligence, and Machine Learning.
- ❖ Mahatma Gandhi University, Kottayam, has signed a MOU to facilitate research in Nano Technology and provide research assistance to faculty of GAT.
- ❖ Industrial consultancy undertaken in many departments.
- ❖ Excellent Placement with more than 80% of the eligible students placed in leading IT companies, core industries and Start-up companies.
- ❖ Holistic and integrated training modules covering communication skills, leadership skills, soft skills and technical skills through professional trainers.
- ❖ On campus and off campus internship facilities.
- ❖ Robust parent connects and Student counselling system.
- ❖ In-house technical skill training programs/add on courses to enhance the employability of the students.
- ❖ Strong and growing alumni connect in place.
- ❖ Exclusive Research and Development, Industry–Institute Interaction Cell and Teaching and Learning Centre in place.
- ❖ Rainwater harvesting facility in the campus.

The following academic processes are implemented on a regular basis to sustain a meaningful and proactive teaching-learning environment:

- ❖ Emphasis on **continuous revision of the curriculum**, based on feedback from the students and input from industry, alumni, and other stakeholders.
- ❖ Conduction of regular **training programme** for faculty, technical & supporting staff.
- ❖ Conduction of Academic Audit of each department on an annual basis.
- ❖ Under **open electives** students have the options to study subjects offered by other departments to augment their interdisciplinary knowledge.
- ❖ Students have to do **value added courses**, mandatory courses, certificate courses, and become members of professional bodies, etc.
- ❖ Advanced and enrichment courses are offered as Electives during the final year UG and PG Degree Programmes.
- ❖ **Self-Learning** is encouraged in students through MOOCs, NPTEL/SWAYAM, Coursera, Edex etc. Credit shall be awarded to students for completion of such courses.

# Department of Mechanical Engineering

(Accredited by National Board of Accreditation, New Delhi)

## **Vision of the Department:**

Become one of the leading providers of education in mechanical engineering with emphasis on research, development, and innovation for the benefit of society.

## **Mission of the Department:**

- Impart quality technical education in the field of mechanical engineering through excellent teaching-learning process, modern infrastructure and computing tools
- Prepare students for successful careers by providing placements and encouraging research, development and innovation through industry-institute interaction
- Instil professional ethics and environmental consciousness amongst students through inclusive development programs

## **About the Department:**

Mechanical Engineering is one of the broadest and the most versatile engineering profession finding its application in all fields of technology. The boost in the manufacturing sector has raised the demand for Mechanical Engineers exponentially. The uniqueness of the discipline incorporates skills and expertise in the areas of Design, Manufacturing, Mechanics and Thermal sciences besides inter-disciplinary subjects that are essential to most sectors of industry.

The department is achieving its milestones at various stages of its growth by upgrading the course-curriculum for catering the needs of industry and research, by developing and maintaining state-of-art laboratories CNC Technology, 3D Printing and Automation.

The department conducts various training programs in collaboration with renowned industrial organizations such as Toyota, AMS-India, TATA Electronics Pvt. Ltd, EMI Product, Askar Microns, etc.

Our student teams have developed Formula Car, Go Kart and Solar Powered Vehicle and participated in racing competitions, won prizes, and have brought laurels to our department and to the college.

### **PROGRAM EDUCATIONAL OBJECTIVES (PEOs) of the DEPARTMENT**

**PEO** of Graduate students in Mechanical Engineering aims to have:

**PEO1:** Engineering competence, critical thinking, creativity, and ethical inclusivity in professional practice.

**PEO2:** Continuous intellectual growth through advanced education, professional development, independent inquiry, and experiential learning.

**PEO3:** Leadership and teamwork excellence throughout professional careers.

### **PROGRAM SPECIFIC OUTCOMES (PSOs) of the DEPARTMENT**

After successful completion of Mechanical Engineering Program, the graduates will be able to:

**PSO1:** Specify, design, and analyze machine elements using CAD/CAE software.

**PSO2:** Evaluate thermal performance of Heating, Ventilation & Air-Conditioning systems, electronic systems, Solar Roof Top Photo-Voltaic systems using experimental approach or /and CFD tools and design these systems for better performance.

**PSO3:** Develop composite materials, manufacturing processes and products in an efficient, safe and cost-effective manner.

# III - VIII SEMESTER SCHEME



Head of Department,  
Mechanical Engineering  
Global Academy of Technology  
Bangalore - 98



# Global Academy of Technology

(An Autonomous Institution, affiliated to VTU, Belagavi, recognized by Karnataka and Approved by AICTE, New Delhi.)

## B.E. in Mechanical Engineering Scheme of Teaching and Examinations 2023

Outcome Based Education (OBE) and Choice Based Credit

System (CBCS)

(Effective from the academic year 2023-24)



### III SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours/Week				Examination			CREDITS	
					Theory/Lecture	Tutorial	Practical/ Drawing	Self - Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	BSC	MAT23301C	Complex Variables and Probability	TD - MAT PSB - MAT	2	2	0		03	50	50	100	3
2	IPCC	MED23302	Material Science and Engineering	TD - ME PSB - ME	3	0	2		03	50	50	100	4
3	IPCC	MED23303	Manufacturing Process		3	0	2		03	50	50	100	4
4	PCC	MED23304	Mechanics of Materials		2	2	0		03	50	50	100	3
5	ESC	MED23305X	ESC/ETC/PLC	TD & PSB – Respective Dept.	3	0	0		03	50	50	100	3
6	MC	SCK23306	Social Connect and Responsibility	Any Department	0	0	2		01	100	---	100	1
7	AEC	MED23307X	Ability Enhancement Course/ Skill Enhancement Course - I	TD & PSB: Concerned Department	2	0	0		01	50	50	100	2
			<b>OR</b>										
			Ability Enhancement Course/ Skill Enhancement Course – I	TD & PSB: Concerned Department	1	0	2		02				
8	MC	NSK23308	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		PEK23308	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		YOK23308	Yoga	Yoga Teacher									
<b>Total</b>									<b>500</b>	<b>300</b>	<b>800</b>	<b>20</b>	

**PCC:** Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **MC:** Mandatory Course (Non-credit), **AEC:** Ability Enhancement Course, **SEC:** Skill Enhancement Course, **L:** Lecture, **T:** Tutorial, **P:** Practical **S = SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **K:** This letter in the course code indicates common to all the stream of engineering. **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course.

**Engineering Science Course (ESC/ETC/PLC)**

MED23305A	Computer Aided Modelling [2-0-2]	MED23305C	Waste handling and Management [3-0-0]
MED23305B	Internet of Things [3-0-0]	MED23305D	Automation in Manufacturing

**Ability Enhancement Course/ Skill Enhancement Course - III**

MED23307A	Advanced Python Programming [1-0-2]	MED23307C	Spreadsheet for Engineers [1-0-2]
MED23307B	Fundamentals of Additive Manufacturing [1-0-2]	MED23307D	Tools in Scientific Computing [1-0-2]

**Professional Core Course (IPCC):** Refers to Professional Core Course Theory Integrated with practical's of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23 may please be referred.

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.



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## B.E. in Mechanical Engineering Scheme of Teaching and Examinations 2023

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)



### IV SEMESTER

Sl. No.	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours/Week				Examination			CREDITS	
					Theory/Lecture	Tutorial	Practical/Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	BSC	MAT23401C	Transforms Calculus and Numerical Techniques	TD – MAT, PSB - MAT	2	2	0		03	50	50	100	3
2	IPCC	MED23402	Mechanical Measurements & Metrology	TD - ME PSB - ME	3	0	2		03	50	50	100	4
3	PCC	MED23403	Thermodynamics		3	2	0		03	50	50	100	4
4	PCC	MED23404	Theory of Machines		2	2	0		03	50	50	100	3
5	ESC	MED23405X	ESC/ETC/PLC	TD & PSB – Respective Dept.	3	0	0		03	50	50	100	3
6	UHV	UHK23406	Universal human values course	Any Department	1	0	0		01	50	50	100	1
7	AEC	MED23407X	Ability Enhancement Course/Skill Enhancement Course- II	TD & PSB: Concerned Department	1	0	0		01	50	50	100	1
				<b>OR</b>									
			Ability Enhancement Course/Skill Enhancement Course- II	TD & PSB: Concerned Department	0	0	2		02				
8	MC	NSK23408	National Service Scheme (NSS)	NSS coordinator									
		PEK23408	Physical Education (PE) (Sports and Athletics)	Physical Education Director	0	0	2			100	---	100	0
		YOK23408	Yoga	Yoga Teacher									
9	PCCL	MEDL23409	Machine Shop	TD – ME, PSB - ME	0	0	2		03	50	50	100	1
<b>Total</b>									<b>500</b>	<b>400</b>	<b>900</b>	<b>20</b>	

**PCC:** Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **MC:** Mandatory Course (Non-credit), **AEC:** Ability Enhancement Course, **SEC:** Skill Enhancement Course, **L:** Lecture, **T:** Tutorial, **P:** Practical **S = SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **K:** This letter in the course code indicates common to all the stream of engineering. **ESC:** Engineering Science Course, **ETC:** Emerging Technology Course, **PLC:** Programming Language Course.

#### Engineering Science Course (ESC/ETC/PLC)

MED23405A	Non-Traditional Machining	MED23405C	Micro Electromechanical Systems
MED23405B	Mechatronics	MED23405D	Energy Engineering

#### Ability Enhancement Course/Skill Enhancement Course- II

MED23407A	Introduction to AI & ML	MED23407C	Geometric Dimensioning & Tolerancing
MED23407B	Digital Marketing	MED23407D	Introduction in Programming in C++

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Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2023-24)



### V SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	HSMS	MED23501	Industrial Management & Economics	TD: MEPSB:ME	3	0	0		03	50	50	100	3
2	IPCC	MED23502	Fluid Mechanics Machinery	TD:ME PSB:ME	2	2	2		03	50	50	100	4
3	PCC	MED23503	Machine Design	TD: ME PSB:ME	3	2	0		03	50	50	100	4
4	PCCL	MEDL23504	CNC Programming Laboratory	TD: ME PSB:ME	0	0	2		03	50	50	100	1
5	PEC	MED23505X	Professional Elective - I	TD: ME PSB:ME	3	0	0		03	50	50	100	3
6	PROJ	MEDP23506	Mini Project	TD: ME PSB:ME	0	0	4		03	100	-	100	2
7	AEC	RMIK23507	Research Methodology and IPR	Any Department	3	0	0		03	50	50	100	3
8	MC	CIVK23508	Environmental Studies	TD: CV/Env/Chem PSB:CV	2	0	0		02	50	50	100	2
9	MC	NSK23509	National Service Scheme (NSS)	NSS coordinator	0	0	2			100		100	0
		PEK23509	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		YOK23509	Yoga	Yoga Teacher									
<b>Total</b>									<b>550</b>	<b>350</b>	<b>900</b>	<b>22</b>	

**Professional Elective Course - I**

MED23505A	Control Engineering	MED23505C	Supply chain management & Introduction to SAP
MED23505B	Product Life Cycle Management	MED23505D	Operations Research

**PCC:** Professional Core Course, **PCCL:** Professional Core Course laboratory, **UHV:** Universal Human Value Course, **MC:** Mandatory Course (Non-credit), **AEC:** Ability Enhancement Course, **SEC:** Skill Enhancement Course, **L:** Lecture, **T:** Tutorial, **P:** Practical **S= SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **K :** The letter in the course code indicates common to all the stream of engineering. **PROJ:** Project /Mini Project. **PEC:** Professional Elective Course.

**Professional Core Course (IPCC):** Refers to Professional Core Course Theory Integrated with practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23

**National Service Scheme /Physical Education/Yoga:** All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

**Mini-project work:** Mini Project is a laboratory-oriented/hands on course that will provide a platform to students to enhance their practical knowledge and skills by the development of small systems/applications etc. Based on the ability/abilities of the student/s and recommendations of the mentor, a single discipline or a multidisciplinary Mini- project can be assigned to an individual student or to a group having not more than 4 students.

**CIE procedure for Mini-project:**

**(i) Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two faculty members of the Department, one of them being the Guide. The CIE marks awarded for the Mini-project work shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio of 50:25:25. The marks awarded for the project report shall be the same for all the batches mates.

**(ii) Interdisciplinary:** Continuous Internal Evaluation shall be group-wise at the college level with the participation of all the guides of the project. The CIE marks awarded for the Mini-project, shall be based on the evaluation of the project report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**No SEE component for Mini-Project.**

**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering. Each group will provide an option to select one course. The minimum number of students' strengths for offering a professional elective is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.



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### VI SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PCC	MED23601	Finite Element Methods	TD: ME PSB:ME	3	2	0		03	50	50	100	4
2	IPCC	MED23602	Heat Transfer	TD: ME PSB:ME	3	0	2		03	50	50	100	4
3	PEC	MED23603X	Professional Elective - II	TD: ME PSB:ME	3	0	0		03	50	50	100	3
4	OEC	MED23604X	Open Elective -I	TD: ME PSB:ME	3	0	0		03	50	50	100	3
5	PROJ	MEDP23605	Major Project Phase - I	TD: ME PSB:ME	0	0	4		03	100	--	100	2
6	PCCL	MEDL23606	Analysis Laboratory	TD: ME PSB:ME	0	0	2		03	50	50	100	1
7	AEC/ SDC	MED23607X	Ability Enhancement Course/ SkillDevelopment Course - III	TD & PSB: Concerned Department	If the course is offered as a Theory				01	50	50	100	1
					1	0	0						
					If course is offered as a practical								
					0	0	2						
8	MC	NSK23608	National Service Scheme (NSS)	NSS coordinator									
		PEK23608	Physical Education (PE) (Sports and Athletics)	Physical Education Director	0	0	2		100	---	100	0	
		YOK23608	Yoga	Yoga Teacher									
9	IKS	IKSK23609	Indian Knowledge System		1	0	0		01	100	0	100	0
									<b>Total</b>	<b>600</b>	<b>300</b>	<b>900</b>	<b>18</b>

Professional Elective Course- II			
MED23603A	Design of Transmission Elements	MED23603C	Project and Operations Management
MED23603B	Refrigeration and Air Conditioning	MED23603D	Renewable Energy Technologies
Open Elective Course - I			
MED23604A	Supply Chain Management	MED23604C	Total Quality Management
MED23604B	Renewable Energy Power plants	MED23604D	Modern Mobility
Ability Enhancement Course / Skill Enhancement Course - III			
MED23607A	Basics of MATLAB	MED23607C	Introduction Augmented Reality
MED23607B	Fundamental of Virtual Reality ARP Development	MED23607D	Simulation and Analysis using Ansys workbench
<p><b>PCC:</b> Professional Core Course, <b>PCCL:</b> Professional Core Course laboratory, <b>UHV:</b> Universal Human Value Course, <b>MC:</b> Mandatory Course (Non-credit), <b>AEC:</b> Ability Enhancement Course, <b>SEC:</b> Skill Enhancement Course, <b>L:</b> Lecture, <b>T:</b> Tutorial, <b>P:</b> Practical <b>S= SDA:</b> Skill Development Activity, <b>CIE:</b> Continuous Internal Evaluation, <b>SEE:</b> Semester End Evaluation. <b>K :</b> The letter in the course code indicates common to al the stream of engineering. <b>PROJ:</b> Project /Mini Project. <b>PEC:</b> Professional Elective Course. <b>PROJ:</b> Project Phase -I, <b>OEC:</b> Open Elective Course</p>			
<p><b>Professional Core Course (IPCC):</b> Refers to Professional Core Course Theory Integrated with practical of the same course. Credit for IPCC can be 04 and its Teaching– Learning hours (L : T : P) can be considered as (3 : 0 : 2) or (2 : 2 : 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./B.Tech.) 2022-23</p>			
<p><b>National Service Scheme /Physical Education/Yoga:</b> All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first week of III semesters. Activities shall be carried out between III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.</p>			
<p><b>Professional Elective Courses (PEC):</b> A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering. Each group will provide an option to select one course. The minimum number of students’ strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.</p>			
<p><b>Open Elective Courses:</b> Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor. The minimum numbers of students’ strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.</p>			
<p><b>Project Phase-I :</b> Students have to discuss with the mentor /guide and with their help he/she has to complete the literature survey and prepare the report and finally define the problem statement for the project work.</p>			



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(Effective from the academic year 2023-24)



### Scheme A- VII SEMESTER (Swappable VII and VIII SEMESTER)

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question and Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PCC	MED23701	Industrial Robotics	TD: ME, PSB:ME	3	2	0		03	50	50	100	4
2	IPCC	MED23702	Hydraulics and Pneumatics	TD: ME, PSB:ME	3	0	2		03	50	50	100	4
3	IPCC	MED23703	Mechanical Vibrations	TD: ME, PSB:ME	3	0	2		03	50	50	100	4
4	PEC	MED23704x	Professional Elective-III	TD: ME PSB:ME	3	0	0		03	50	50	100	3
5	OEC	MED23705x	Open Elective- II	TD: ME PSB:ME	3	0	0		01	50	50	100	3
6	PROJ	MEDP23706	Major Project Phase-II		0	0	12		03	100	100	200	6
									<b>Total</b>	<b>350</b>	<b>350</b>	<b>700</b>	<b>24</b>

#### Professional Elective Course

MED23704A	Design for Manufacturing and Assembly	MED23704C	Total Quality Management
MED23704B	Thermal Management of Electronic Equipment	MED23704D	Automotive Engineering & Hybrid Vehicle Technology

#### Open Elective Course

MED23705A	Additive Manufacturing	MED23705C	Operations Research
MED23705B	Project and Operations Management	MED23705D	Strategies for Sustainable Design

**PCC:** Professional Core Course, **PCCL:** Professional Core Course laboratory, **PEC:** Professional Elective Course, **OEC:** Open Elective Course **PR:** Project Work, **L:** Lecture, **T:** Tutorial, **P:** Practical **S= SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **TD-** Teaching Department, **PSB:** Paper Setting department, **OEC:** Open Elective Course, **PEC:** Professional Elective Course. **PROJ:** Project work

**Note: VII and VIII semesters of IV years of the program**

(1) Institutions can swap the VII and VIII Semester Schemes of Teaching and Examinations to accommodate research internships/ industry internships after the VI

semester.

**(2)** Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether the VII or VIII semesters is completed during the beginning of the IV year or the later part of IV years of the program.

**Professional Elective Courses (PEC):** A professional elective (PEC) course is intended to enhance the depth and breadth of educational experience in the Engineering and Technology curriculum. Multidisciplinary courses that are added supplement the latest trend and advanced technology in the selected stream of engineering. Each group will provide an option to select one course. The minimum number of students' strengths for offering professional electives is 10. However, this conditional shall not be applicable to cases where the admission to the program is less than 10.

**Open Elective Courses:**

Students belonging to a particular stream of Engineering and Technology are not entitled to the open electives offered by their parent Department. However, they can opt for an elective offered by other Departments, provided they satisfy the prerequisite condition if any. Registration to open electives shall be documented under the guidance of the Program Coordinator/ Advisor/Mentor. The minimum numbers of students' strength for offering Open Elective Course is 10. However, this condition shall not be applicable to class where the admission to the program is less than 10.

**PROJECT WORK (21MEP75):** The objective of the Project work is

- (i)** To encourage independent learning and the innovative attitude of the students.
- (ii)** To develop interactive attitude, communication skills, organization, time management, and presentation skills.
- (iii)** To impart flexibility and adaptability.
- (iv)** To inspire team working.
- (v)** To expand intellectual capacity, credibility, judgment and intuition.
- (vi)** To adhere to punctuality, setting and meeting deadlines.
- (vii)** To install responsibilities to oneself and others.
- (viii)** To train students to present the topic of project work in a seminar without any fear, face the audience confidently, enhance communication skills, involve ingroup discussion to present and exchange ideas.

**CIE procedure for Project Work:**

**(1) Single discipline:** The CIE marks shall be awarded by a committee consisting of the Head of the concerned Department and two senior faculty members of the Department, one of whom shall be the Guide.

The CIE marks awarded for the project work, shall be based on the evaluation of the project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**(2) Interdisciplinary:** Continuous Internal Evaluation shall be group-wise at the college level with the participation of all guides of the college. Participation of external guide/s, if any, is desirable. The CIE marks awarded for the project work, shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25. The marks awarded for the project report shall be the same for all the batch mates.

**SEE procedure for Project Work:** SEE for project work will be conducted by the two examiners appointed by the University. The SEE marks awarded for the project work shall be based on the evaluation of project work Report, project presentation skill, and question and answer session in the ratio 50:25:25.



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### Scheme A- VIII SEMESTER (Swappable VII and VIII SEMESTER)

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PEC	MED23801x	Professional Elective -IV (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	OEC	MED23802x	Open Elective - III (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
3	INT	MEDI23803	Internship (Industry/Research) (14 - 20 weeks)	TD: ME	0	0	12		03	100	100	200	10
<b>Total</b>									<b>200</b>	<b>200</b>	<b>400</b>	<b>16</b>	

### Professional Elective Course (Online courses)

MED23801A	Quality Design & Control (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc21_mg24/preview">https://onlinecourses.nptel.ac.in/noc21_mg24/preview</a>	MED23801C	Machinery Fault Diagnosis and Signal Processing (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc22_me60/preview">https://onlinecourses.nptel.ac.in/noc22_me60/preview</a>
MED23801B	Product Design and Manufacturing (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc21_me66/preview">https://onlinecourses.nptel.ac.in/noc21_me66/preview</a>	MED23801D	Computer Integrated Manufacturing (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc22_me10/preview">https://onlinecourses.nptel.ac.in/noc22_me10/preview</a>

### Open Elective Courses (Online Courses)

MED23802A	Fundamentals of automotive systems (Available in NPTEL) <a href="https://archive.nptel.ac.in/courses/107/106/107106088/">https://archive.nptel.ac.in/courses/107/106/107106088/</a>	MED23802C	Strategies for Sustainable Design (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc21_de07/preview">https://onlinecourses.nptel.ac.in/noc21_de07/preview</a>
MED23802B	Industrial Safety Engineering (Available in NPTEL) <a href="https://onlinecourses.nptel.ac.in/noc20_mg43/preview">https://onlinecourses.nptel.ac.in/noc20_mg43/preview</a>	MED23802D	Business Planning & Project Management (Available in NPTEL) <a href="https://onlinecourses.swayam2.ac.in/cec21_ge06/preview">https://onlinecourses.swayam2.ac.in/cec21_ge06/preview</a>

**L:** Lecture, **T:** Tutorial, **P:** Practical **S= SDA:** Skill Development Activity, **CIE:** Continuous Internal Evaluation, **SEE:** Semester End Evaluation. **TD-** Teaching Department, **PSB:** Paper Setting department, **OEC:** Open Elective Course, **PEC:** Professional Elective Course. **PROJ:** Project work, **INT:** Industry Internship / Research Internship / Rural Internship

**Note: VII and VIII semesters of IV years of the program**

**Swapping Facility**

- Institutions can swap VII and VIII Semester Scheme of Teaching and Examinations to accommodate **research internships/ industry internships/Rural Internship** after the VI semester.
- Credits earned for the courses of VII and VIII Semester Scheme of Teaching and Examinations shall be counted against the corresponding semesters whether VII or VIII semester is completed during the beginning of IV year or later part of IV year of the program.

**Elucidation:**

At the beginning of IV years of the program i.e., after VI semester, VII semester classwork and VIII semester **Research Internship /Industrial Internship / Rural Internship** shall be permitted to be operated simultaneously by the University so that students have ample opportunity for an internship. In other words, a good percentage of the class shall attend VII semester classwork and a similar percentage of others shall attend to Research Internship or Industrial Internship or Rural Internship.

Research/Industrial /Rural Internship shall be carried out at an Industry, NGO, MSME, Innovation centre, Incubation centre, Start-up, centre of Excellence (CoE), Study Centre established in the parent institute and /or at reputed research organizations/institutes.

The mandatory Research internship /Industry internship / Rural Internship is for 14 to 20 weeks. The internship shall be considered as a head of passing and shall be considered for the award of a degree. Those, who do not take up/complete the internship shall be declared to fail and shall have to complete it during the subsequent University examination after satisfying the internship requirements.

**Research internship:** A research internship is intended to offer the flavour of current research going on in the research field. It helps students get familiarized with the field and imparts the skill required for carrying out research.

**Industry internship:** Is an extended period of work experience undertaken by students to supplement their degree for professional development. It also helps them learn to overcome unexpected obstacles and successfully navigate organizations, perspectives, and cultures. Dealing with contingencies helps students recognize, appreciate, and adapt to organizational realities by tempering their knowledge with practical constraints.

**Rural Internship:** Rural development internship is an initiative of Unnat Bharat Abhiyan Cell, RGIT in association with AICTE to involve students of all departments studying in different academic years for exploring various opportunities in techno-social fields, to connect and work with Rural India for their upliftment.

The faculty coordinator or mentor has to monitor the student's internship progress and interact with them to guide for the successful completion of the internship.

The students are permitted to carry out the internship anywhere in India or abroad. University shall not bear any expenses incurred in respect of the internship.

With the consent of the internal guide and Principal of the Institution, students shall be allowed to carry out the internship at their hometown (**within or outside the state or abroad**), provided favorable facilities are available for the internship and the student remains regularly in contact with the internal guide. **University shall not bear any cost involved in carrying out the internship by students.** However, students can receive any financial assistance extended by the organization.

**Professional Elective /Open Elective Course:** These are ONLINE courses suggested by the respective Board of Studies. Details of these courses shall be made available for students on the VTU web portal.



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### Scheme B-VI SEMESTER for the candidates who seek a two-semester internship with project work /Start-up

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination			Credits	
					Theory Lecture	Tutorial	Practical/ Drawing	Self -Study	Duration in hours	CIE Marks	SEE Marks		Total Marks
					L	T	P	S					
1	PCC	MED23601	Finite Element Methods	TD: ME PSB:ME	3	2	0		03	50	50	100	4
2	IPCC	MED23602	Heat Transfer	TD: ME PSB:ME	3	0	2		03	50	50	100	4
3	PEC	MED23603X	Professional Elective Course	TD: ME PSB: ME	3	0	0		03	50	50	100	3
4	OEC	MED23604X	Open Elective Course	TD: ME PSB: ME	3	0	0		03	50	50	100	3
5	PCCL	MEDL23606	Analysis Laboratory	TD: ME PSB: ME	0	0	2		01	50	50	100	1
6	AEC	MED23607X	Ability Enhancement Course/Skill Development Course V	TD: ME PSB:ME	If the course is offered as a Theory				03	50	50	100	1
					1	0	0						
					If course is offered as a practical								
					0	0	2						
7	MC	NSK23608	National Service Scheme (NSS)	NSS coordinator					03				
		PEK23608	Physical Education (PE) (Sports and Athletics)	Physical Education Director	0	0	2		03	100	-	100	0
		YOK23608	Yoga	Yoga Teacher					01				
8	IKS	IKSK23609	Indian Knowledge System	Any Department	1	0	0		03	100	0	100	0
<b>Total</b>									<b>500</b>	<b>300</b>	<b>800</b>	<b>16</b>	



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### Scheme B: VII and VIII semesters for the candidates who seek an internship with project work

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours /Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	Self -Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC	MED23701	Industrial Robotics To be completed in 5th/6th semester	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	IPCC	MED23702	Hydraulics and Pneumatics To be completed in 5th /6th semester	TD: ME PSB:ME	3	0	2		03	50	50	100	4
3	IPCC	MED23703	Mechanical Vibrations To be completed in the 6 <sup>th</sup> semester	TD: ME PSB: ME	3	0	2		03	50	50	100	4
4	PEC	MED23704x	Professional Elective Course (MOOC Courses)	TD: ME PSB: ME	3	0	0		03	50	50	100	3
5	OEC	MED23705x	Open Elective Courses (MOOC courses)	TD: ME PSB: ME	3	0	0		01	50	50	100	3
1	PEC	MED23801x	Professional Elective -IV (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	OEC	MED23802x	Open Elective - III (Online Courses)	TD: ME PSB:ME	3	0	0		01	50	50	100	3
3	PROJ	MED23803	Project – Outcome of Training	TD: ME PSB:ME	0	0	12		03	100	100	200	9
4	INT	MED23804	Internship (Industry/Research) (02 semesters)	TD: ME	0	0	12		03	100	100	200	10
<b>Total</b>									<b>550</b>	<b>550</b>	<b>1100</b>	<b>42</b>	