First Year
Scheme & Syllabus
(2022 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 2022–23 (Effective from the academic year 2022 – 23)

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	BSC	22MAT11	LINEAR ALGEBRA AND CALCULUS	MAT	MAT	3	2	0	50	50	100	4
2	BSC	22PHY12	ENGINEERING PHYSICS (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	ESC	22MEE13	ELEMENTS OF MECHANICAL ENGINEERING	ME	ME	3	0	0	50	50	100	3
4	ESC-1	22CIV14	ENGINEERING MECHANICS	CV	CV	2	2	0	50	50	100	3
5	PLC-1	22ISE151	PYTHON PROGRAMMING (INTEGRATED)	ISE	ANY	3	0	2	50	50	100	4
6	AEC	22EGH16	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	22KSK17/ 22KBK17	Samskrutika Kannada / Balake Kannada	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	16	4	4	350	350	700	20

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

HEAD OF THE DEPARTMENT
Dept of Science & Humanities
Global Academy of Technology,
Rajarajeshwari Nagar Bengaluru-98.

Dean Academic
Global Academy of Technology,
Rajarajeshwarinagar, Bengaluru-98

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2022–23 (Effective from the academic year 2022 – 23)

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	BSC	22MAT11	LINEAR ALGEBRA AND CALCULUS	MAT	MAT	3	2	0	50	50	100	4
2	BSC	22CHE12	ENGINEERING CHEMISTRY (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	ESC	22MEG13	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
4	ESC-1	22CSE14	C PROGRAMMING (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
5	ETC -1	22ANE151/ 22MEE151	INTRODUCTION TO DRONES / INTRODUCTION TO ROBOTICS	ME/AE	ME/AE	3	0	0	50	50	100	3
6	HSMC	22IDT16	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	22CIP17	CONSTITUION OF INDIA AND PROFESSIONAL ETHICS	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	16	2	6	350	350	700	20

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

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2022–23 (Effective from the academic year 2022 – 23)

II 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	BSC	22MAT21	INTEGRAL CALCULUS AND DIFFERENTIAL EQUATION	MAT	MAT	3	2	0	50	50	100	4
2	BSC	22PHY22	ENGINEERING PHYSICS (INTEGRATED)	PHY	PHY	3	0	2	50	50	100	4
3	ESC	22MEE23	ELEMENTS OF MECHANICAL ENGINEERING	ME	ME	3	0	0	50	50	100	3
4	ESC-2	22CIV24	ENGINEERING MECHANICS	CV	CV	2	2	0	50	50	100	3
5	PLC-2	22ISE251	PYTHON PROGRAMMING (INTEGRATED)	ISE	ANY	3	0	2	50	50	100	4
6	AEC	22EGH26	COMMUNICATIVE ENGLISH	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	22KSK27/ 22KBK27	Samskrutika Kannada / Balake Kannada	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	16	4	4	350	350	700	20

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

GLOBAL ACADEMY OF TECHNOLOGY (Autonomous Institution Under VTU)

Scheme of Teaching and Examination 2022–23 (Effective from the academic year 2022 – 23)

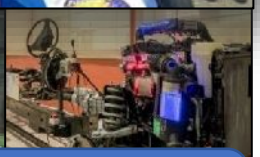
II SEMESTER B.E. (CHEMISTRY GROUP) – ME Stream (ME/AE)

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	BSC	22MAT 21	INTEGRAL CALCULUS AND DIFFERENTIAL EQUATION	MAT	MAT	3	2	0	50	50	100	4
2	BSC	22CHE22	ENGINEERING CHEMISTRY (INTEGRATED)	CHE	CHE	3	0	2	50	50	100	4
3	ESC	22MEG23	COMPUTER AIDED ENGINEERING DRAWING	ME	ME	2	0	2	50	50	100	3
4	ESC-2	22CSE24	C PROGRAMMING (INTEGRATED)	CSE	ANY	3	0	2	50	50	100	4
5	ETC -2	22ANE251/ 22MEE251	INTRODUCTION TO DRONES / INTRODUCTION TO ROBOTICS	AE/ME	AE/ME	3	0	0	50	50	100	3
6	HSMC	22IDT26	INNOVATION AND DESIGN THINKING	HUMANITIES	ANY	1	0	0	50	50	100	1
7	HSMC	22CIP27	CONSTITUION OF INDIA AND PROFESSIONAL ETHICS	HUMANITIES	ANY	1	0	0	50	50	100	1
					TOTAL	**16**	**2**	**6**	**350**	**350**	**700**	**20**

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

III - VIII Semester Scheme (2022) 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

Dean Academic
Global Academy of Technology,
Rajarajeshwarinagar, Bengal[illegible]-98

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.

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

- 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.

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

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.

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

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.

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

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 2022

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

(Effective from the academic year 2022-23)

III SEMESTER

Sl. No.	Course Code	Course Title	Course Type	Teaching Dept.	Teaching Hours/Week			Examination			CREDITS
					L	T	P	CIE	SEE	Total	
1	22MAT31C	Complex Variables and Probability	BS	MAT	2	2	0	50	50	100	3
2	22MED32	Strength of Materials (Integrated)	IPC	Respective Department	3	0	2	50	50	100	4
3	22MED33	Manufacturing Process (Integrated)	IPC		3	0	2	50	50	100	4
4	22MED34	Computer Aided Modelling	PC		2	0	2	50	50	100	3
5	22MED35	Material Science and Engineering	ESC		3	0	0	50	50	100	3
6	22MED36	Ability Enhancement Course – I: **Modelling & 3D Printing**	AEC		2	0	2	50	50	100	3
							Total	**300**	**300**	**600**	**20**

IV SEMESTER

Sl. No.	Course Code	Course Title	Course Type	Teaching Dept.	Teaching Hours/Week			Examination			CREDITS
					L	T	P	CIE	SEE	Total	
1	22MAT41C	Transforms Calculus and Numerical Techniques	BS	MAT	2	2	0	50	50	100	3
2	22MED42	Mechanical Measurements & Metrology (Integrated)	IPC	Respective Department	3	0	2	50	50	100	4
3	22MED43	Mechatronics	PC		3	0	0	50	50	100	3
4	22MED44	Theory of Machines	PC		2	2	0	50	50	100	3
5	22MED45	Thermodynamics	ESC		2	2	0	50	50	100	3
6	22MED46	Ability Enhancement Course – II: **Automation through Hydraulics & Pneumatics**	AEC		2	0	2	50	50	100	3
7	22MEDL47	Machine Shop	PC		0	0	1	50	50	100	1
							Total	**350**	**350**	**700**	**20**

Global Academy of Technology

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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)

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	22MED51	Industrial Management & Economics	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	IPCC	22MED52	Fluid Mechanics Machinery	TD:ME PSB:ME	2	2	2		03	50	50	100	4
3	PCC	22MED53	Machine Design	TD: ME PSB:ME	3	2	0		03	50	50	100	4
4	PCCL	22MEDL54	CNC Programming Laboratory	TD: ME PSB:ME	0	0	2		03	50	50	100	1
5	PEC	22MED55x	Professional Elective - I	TD: ME PSB:ME	3	0	0		03	50	50	100	3
6	PROJ	22MEDP56	Mini Project	TD: ME PSB:ME	0	0	4		03	100	-	100	2
7	AEC	22RMIK57	Research Methodology and IPR	Any Department	3	0	0		03	50	50	100	3
8	MC	22CIVK58	Environmental Studies	TD: CV/Env/Chem PSB:CV	2	0	0		02	50	50	100	2
9	MC	22NSK59	National Service Scheme (NSS)	NSS coordinator	0	0	2			100		100	0
		22PEK59	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		22YOK59	Yoga	Yoga Teacher									
									Total	**550**	**350**	**900**	**22**

Professional Elective Course - I			
22MED55A	Control Engineering	22MED55C	Supply Chain Management & Introduction to SAP
22MED55B	Product Life Cycle Management	22MED55D	Automation in Manufacturing

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 al 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 batchmates.

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.

Global Academy of Technology

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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)

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	22MED61	Finite Element Methods	TD: ME PSB:ME	3	2	0		03	50	50	100	4
2	IPCC	22MED62	Heat Transfer	TD: ME PSB:ME	3	0	2		03	50	50	100	4
3	PEC	22MED63x	Professional Elective - II	TD: ME PSB:ME	3	0	0		03	50	50	100	3
4	OEC	22MED64x	Open Elective -I	TD: ME PSB:ME	3	0	0		03	50	50	100	3
5	PROJ	22MEDP65	Major Project Phase - I	TD: ME PSB:ME	0	0	4		03	100	-	100	2
6	PCCL	22MEDL66	Analysis Laboratory	TD: ME PSB:ME	0	0	2		03	50	50	100	1
7	AEC/ SDC	22MED67x	Ability Enhancement Course/ SkillDevelopment Course - III	TD & PSB: Concerned Department	If the course is offered as a Theory: 1	0	0		01	50	50	100	1
					If course is offered as a practical: 0	0	2						
8	MC	22NSK68	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	- - -	100	0
		22PEK68	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		22YOK68	Yoga	Yoga Teacher									
9	IKS	22IKSK69	Indian Knowledge System	Any Department	1	0	0		01	100	-	100	0
10	MC	22UHV69	Universal Human Values	Any Department	1	0	0		01	100	-	100	0
									Total	**700**	**300**	**1000**	**18**

Professional Elective Course- II			
22MED63A	Design of Transmission Elements	22MED63C	Project and Operations Management
22MED63B	Refrigeration and Air Conditioning	22MED63D	Renewable Energy Technologies
Open Elective Course - I			
22MED64A	Supply Chain Management & Introduction to SAP	22MED64C	Total Quality Management
22MED64B	Operations Research	22MED64D	Modern Mobility
Ability Enhancement Course / Skill Enhancement Course - III			
22MED67A	Basics of MATLAB	22MED67C	Introduction Augmented Reality
22MED67B	Fundamental of Virtual Reality ARP Development	22MED67D	Simulation and Analysis using Ansys workbench

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. **PROJ**: Project Phase -I, **OEC**: Open 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.

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 Phase-I : 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.

Global Academy of Technology

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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)

Scheme A- VII 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	PCC	22MED71	Industrial Robotics	TD: ME, PSB:ME	3	2	0		03	50	50	100	4
2	PCC	22MED72	Operations Research	TD: ME, PSB:ME	3	2	0		03	50	50	100	4
3	IPCC	22MED73	Mechanical Vibrations	TD: ME, PSB:ME	3	0	2		03	50	50	100	4
4	PEC	22MED74x	**Professional Elective-III**	TD: ME PSB:ME	3	0	0		03	50	50	100	3
5	OEC	22MED75x	**Open Elective- II**	TD: ME PSB:ME	3	0	0		01	50	50	100	3
6	PROJ	22MEDP76	**Major Project Phase-II**		0	0	12		03	100	100	200	6
									Total	**350**	**350**	**700**	**24**

Professional Elective - III

22MED74A	Design for Manufacturing and Assembly	22MED74C	Total Quality Management
22MED74B	Thermal Management of Electronic Equipment	22MED74D	Automotive Engineering & Hybrid Vehicle Technology

Open Elective - II

22MED75A	Additive Manufacturing	22MED75C	Renewable Energy Power plants
22MED75B	Project and Operations Management	22MED75D	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 Department concerned 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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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)

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	22MED81x	Professional Elective - IV (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	OEC	22MED82x	Open Elective - III (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
3	INT	22MEDI83	Internship (Industry/Research) (14 - 20 weeks)	TD: ME	0	0	12		03	100	100	200	10
									Total	**200**	**200**	**400**	**16**

Professional Elective - IV (Online courses)

22MED81A	Quality Design & Control (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc21_mg24/preview	22MED81C	Machinery Fault Diagnosis and Signal Processing (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc22_me60/preview
22MED81B	Product Design and Manufacturing (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc21_me66/preview	22MED81D	Computer Integrated Manufacturing (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc22_me10/preview

Open Elective - III (Online Courses)

22MED82A	Fundamentals of automotive systems (Available in NPTEL) https://archive.nptel.ac.in/courses/107/106/107106088/	22MED82C	Strategies for Sustainable Design (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc21_de07/preview
22MED82B	Industrial Safety Engineering (Available in NPTEL) https://onlinecourses.nptel.ac.in/noc20_mg43/preview	22MED82D	Business Planning & Project Management (Available in NPTEL) https://onlinecourses.swayam2.ac.in/cec21_ge06/preview

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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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)

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	22MED61	Finite Element Methods	TD: ME PSB:ME	3	2	0		03	50	50	100	4
2	IPCC	22MED62	Heat Transfer	TD: ME PSB:ME	3	0	2		03	50	50	100	4
3	PEC	22MED63X	Professional Elective - II	TD: ME PSB: ME	3	0	0		03	50	50	100	3
4	OEC	22MED64X	Open Elective - 1	TD: ME PSB: ME	3	0	0		03	50	50	100	3
5	PCCL	22MEDL66	Analysis Laboratory	TD: ME PSB: ME	0	0	2		01	50	50	100	1
6	AEC	22MED67X	Ability Enhancement Course/Skill Development Course III	TD: ME PSB:ME	If the course is offered as a Theory: 1	0	0		03	50	50	100	1
					If course is offered as a practical: 0	0	2						
7	MC	NSK2268	National Service Scheme (NSS)	NSS coordinator	0	0	2		03	100	-	100	0
		PEK2268	Physical Education (PE) (Sports and Athletics)	Physical Education Director					03				
		YOK2268	Yoga	Yoga Teacher					01				
8	IKS	IKSK2269	Indian Knowledge System	Any Department	1	0	0		03	100	0	100	0
									Total	**500**	**300**	**800**	**16**

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(Effective from the academic year 2023-24)

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 inhours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC	22MED71	Industrial Robotics To be completed in 5th/6th semester	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	PCC	22MED72	Operations Research To be completed in 5th /6th semester	TD: ME PSB:ME	3	2	0		03	50	50	100	4
3	IPCC	22MED73	Mechanical Vibrations To be completed in the 6th semester	TD: ME PSB: ME	3	0	2		03	50	50	100	4
4	PEC	22MED74x	Professional Elective Course (MOOC Courses)	TD: ME PSB: ME	3	0	0		03	50	50	100	3
5	OEC	22MED75x	Open Elective Courses (MOOC courses)	TD: ME PSB: ME	3	0	0		01	50	50	100	3
1	PEC	22MED81x	Professional Elective -IV (Online Courses)	TD: ME PSB:ME	3	0	0		03	50	50	100	3
2	OEC	22MED82x	Open Elective - III (Online Courses)	TD: ME PSB:ME	3	0	0		01	50	50	100	3
3	PROJ	22MED83	Project – Outcome of Training	TD: ME PSB:ME	0	0	12		03	100	100	200	9
4	INT	22MED84	Internship (Industry/Research) (02 semesters)	TD: ME	0	0	12		03	100	100	200	10
									Total	**550**	**550**	**1100**	**42**