TEERTHANKER MAHAVEER UNIVERSITY
FACULTY OF ENGINEERING
Meeting of Board of Studies (BoS) to be held on July, 2023

List of Agenda Items

Department of Mechanical Engineering

1. No change is required in the contents of B.Tech. (ME) with specialization in Mechatronics for academic session 2023-24.
2. The syllabus of Diploma (Production, Automobile and Refrigeration and air conditioning) is proposed to upgrade as per the current industrial demand and also inclined towards hands on training for academic session 2023-24.
3. Department of Mechanical Engineering has proposed a short-term course on Casting during this summer sessions.
4. Any other matter with the permission of chair.

Teerthanker Mahaveer University, Moradabad

Faculty of Engineering

Mechanical Engineering Department

Minutes of BoS Meeting

A meeting of Board of Studies was held in the principal's office, Faculty of Engineering on 15/07/2023. Following points regarding syllabus of the 2023-24 batch (Diploma & B Tech and approval of short term course syllabus had been discussed by Mechanical Engineering department. Following members were present in the meeting:

1. Prof Lokesh Varshney, Professor, Mechanical Engineering Department, GB Pant University, Pantnagar, UK (External Expert)
2. Prof R K Jain, Professor, Civil Engineering Department, Teerthanker Mahaveer University, Moradabad
3. Dr Himansh Kumar, HoD, ME Department (Chairperson)
4. Dr Sunkulp Goel, Associate Professor, ME Department
5. Dr Rohit K Singh Gautam, Assistant Professor, ME Department (Member)
6. Dr Jaivindra Singh, Assistant Professor, ME Department (Member)
7. All other faculties of the department

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4. Any other matter with the permission of chair.

The following points were discussed in BoS:

1. Department of Mechanical Engineering has suggested no change in the existing syllabus of BTech-Mechanical Engineering for the academic session of 2023-24. However the department has done some major as well as minor changes in the syllabus of Diploma in Mechanical Engineering (Production, Automobile and Refrigeration and air conditioning) for the academic session of 2023-24. BoS members are agreed with all the modifications in the diploma syllabus. The major changes in the diploma syllabus has been mentioned in the table given below:

Himansh Kumar

S. No	Name & code of the courses added	Name & code of the courses deleted	Name & code of the courses where revision is not more than20%	Name of the stakeholder from where the inputs have been received	Need /rationale to justify the revision
1	NIL	NIL	MACHINE TOOL TECHNOLOGY, DME 409	Faculty, students, external and academic Professionals	The syllabus content requires intensive presentation and it is very hard to cover all the topics perfectly within 40 lectures so that modified accordingly.
2	NIL	NIL	MECHANICAL ENGINEERING DRAWING LAB, DME 456	Faculty, students and academic professionals	The course content is not feasible to complete in a semester so that modified accordingly.

2. Mechanical Engineering Department has proposed a short-term value-added course on 'CASTING' and students can also avail this course as a summer internship. The BoS experts have approved the course content without any further modification.

3. The department will restructure the syllabus of BTech and Diploma program (Production, Automobile and Refrigeration and air conditioning) for the academic session of 2024-25 as per the National Education policy-2020 and guidelines of AICTE New Delhi.

4. BoS experts also recommended few changes as per the NEP-2020 which will be incorporated from the academic session 2024-25.

The meeting is ended with vote of thanks.

Himanshu Kumar

Short term course Syllabus

Annexure 1

Course Overview:

Duration: [04weeks/01 month]

Target Audience: [Specify target audience, e.g., students, professionals, hobbyists]

Course Objectives:

- Introduce participants to the fundamentals of casting, including various casting processes and materials.
- Familiarize participants with different types of moulds, their construction, and their application in casting.
- Develop practical skills in mould making, wax preparation, investment casting, sand casting, and other relevant techniques.
- Explore the use of advanced technologies such as 3D printing and computer-aided design (CAD) in casting.
- Provide hands-on experience through practical sessions and workshops.
- Foster a collaborative learning environment where participants can exchange ideas, discuss challenges, and seek guidance from experienced instructors.

Course Outline:

- **Introduction to Casting:** Overview of casting processes, historical context, and its applications in various industries.
- **Mould Making:** Types of moulds, materials, and techniques for creating moulds.
- **Wax Preparation and Pattern Making:** Introduction to wax patterns, gating systems, and assembly techniques.
- **Investment Casting:** Process steps, materials, shell building, and casting parameters.
- **Sand Casting:** Principles of sand casting, pattern design, mold making, and casting techniques.
- **Advanced Casting Technologies:** Introduction to 3D printing, CAD for casting, and other emerging technologies.
- **Practical Sessions:** Hands-on exercises and workshops to reinforce theoretical knowledge and develop skills.

Course Benefits:

- **Enhanced Knowledge:** Participants will gain a comprehensive understanding of casting techniques, materials, and processes.
- **Practical Skills:** Through hands-on activities, participants will develop proficiency in mould making, wax preparation, and casting.
- **Networking Opportunities:** The course will provide a platform for participants to connect with industry experts and fellow learners, fostering valuable professional relationships.
- **Career Advancement:** By equipping participants with the necessary knowledge and skills, this course will enhance their employability in relevant industries.
- **Access to Resources:** Participants will have access to relevant course materials, reference guides, and additional resources to support their learning.

Hemant Kumar

तीर्थंकर महावीर विश्वविद्यालय
Teerthanker Mahaveer University
An Ultimate Destination for World Class Education

Faculty of Engineering
Attendance Sheet for BoS

Date: 15/07/23

Department of Mechanical Engineering
Attendance Sheet

S. No.	External Expert/Chairperson/Faculty Name	Designation	Signature
1.	Dr Lokesh Varshney	Professor	
2.	Dr R. K. Jain	Professor	
3.	Dr Himanshu Kumar	Assi. Professor	
4.	Dr Sunkulp Goel	Asso. Professor	
5.	Dr Rohit kr Singh Gautam	Assi. Professor	
6.	Dr Jaivindra Singh	Assi Professor	
7.	Mr. K.B. Anand	Associate Professor	
8.	Mr. Arun Gupta	Assi. Professor	
9.	Mr. Sunil Kumar	Assi. Professor	
10.	Mr. S.B. Rastogi	Assi. Professor	
11.	Mr. Shri Bhagwan	Assi. Professor	
12.	Mr. Sunil kr Yadav	Assi. Professor	
13.	Mr. Dinesh Kr. Yadav	lecturer	
14.	Mr. Sunil Kr	Assist. Prof	

Course Code: DME409	Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning)- Semester-IV **MACHINE TOOL TECHNOLOGY**	L-4 T-0 P-0 C-4
Course Outcomes:	**The Course learning outcomes (COs): On completion of this course the participants will be able to learn/do/perform the following:**	
CO1.	Remembering the specifications, classifications, construction, parts, working and operations along with accessories and attachments, Automation system.	
CO2.	Understanding working principle of all the concern machines.	
CO3.	Applying the various types of relevant operations for developing the desired work, selection of production tools, fixtures, tools, attachments and accessories.	
CO4.	Analyzing the sequence of operations to develop simple machine components, principle of location and clamping of Jigs and Fixture, selection of cutting fluid and coolants.	
CO5.	Evaluating the various types of machining features like cutting speed, feed, depth of cut for all the concern machines.	
Course Content:		
Unit-1:	**Centre Lathe:** The centre lathe and its principle of working, Types of lathes, Lathe specification and size, Features of lathe bed. Head stock and tail stock, Feed mechanism and change-gears, carriage saddle, Cross slide, Compound rest, Tools post, Apron mechanism, lathe accessories, Chucks, Face plate, Angle plate, Driving plate, Lathe dogs, mandrills, Steady rest, Lathe attachments, Lathe operations-plane and step turning, Taper turning, Screw cutting, Drilling, Boring, reaming, Knurling, Parting off, Under cutting, Relieving, Types of lathe tools and their uses, Brief description of semi-automatic and automatic lathes such as capstan and turret lathes, their advantages and disadvantages over centre lathe, types of job done on them. General and periodic maintained of a centre lathe.	**8 Hours**
Unit-2:	**Shaping, Planning & Slotting Machines:** Working principles of planer, shaper and slitter, Differences and similarities among them, quick return mechanism applied to the machines. **Drilling & Boring Machines:** Types of tools used in drilling and boring, Classification of drilling and boring machines, principle of working and constructional details of simple and radial drilling M/C and general and periodic maintenance, Operations like facing, counter boring, tapering.	**8 Hours**
Unit-3:	**Milling Machines:** Types of milling machines, constructional features of horizontal milling M/C, Simple, compound and differential indexing, milling of spur gears and racks. **Grinding Machines:** Common abrasive grinding wheel materials, Bonds, Grain or grits of abrasive, Grain structure and shapes of common wheels, various speeds and feeds, Use of coolants, Methods of grinding, Types of grinding machines, precision finishing operations like honing.	**8 Hours**
Unit-4:	**Broaching Machines:** Broaching- internal and external surface, Types of work done on broaching machine, Simple types of broaches and their uses, Types of broaching machines, Comparison of broaching with others processes. **Jigs and Fixtures:** Object of Jigs and Fixture, Difference between jigs and fixtures, Principle of location, Principle of clamping, Locating and clamping devices, Types of jigs -Simple open and closed or box jigs, Drill jigs- Bushes (Fixed liner, Renewal slip), Template, Plate jigs, Channel jigs, Leaf jigs, Simple example of milling, turning, grinding, horizontal boring fixtures and broaching fixtures, Welding fixtures, Devices.	**8 Hours**

Unit-5:	**Cooling Process:** Coolants and cutting fluids difference between coolant and cutting fluid, Function and action of cutting fluids, Requirement of good cutting fluids, their selection for different materials and operations. **Automation of Machining Centers:** Introduction to CNC Machine tools (Computer Numerical Control Lathe) and FMS (Flexible Manufacturing System) Introduction only.	**8Hours**
Text Books:	1. Chapman W.C., *Workshop Technology*, Macmillom and Co. Delhi.	
Reference Books:	1. Verculer Narula "*Workshop Technology*, S.K. Kataria & Sons. Delhi. 2. Kapoor J.K., *Machine Tool Technology*, B. Bharti Prakashan Meerut. *** Latest editions of all the suggested books are recommended.**	

Course Code: DME456	Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning)- Semester-IV **MECHANICAL ENGINEERING DRAWING LAB**	L-0 T-0 P-4 C-2
	On completion of this course the students will be:	
CO1.	Understanding the views and sections (Full and half), dimensioning. Technique - Unidirectional and aligned practice conventions as perlatest code of practice for general engineering drawing.	
CO2.	Understanding the Screws & Screw threads, Surface Finish Marks, Limits, and Fits & Tolerances.	
CO3.	Applying Knuckle joint- Part drawing, Solid Modeling, Assembly and Sectioning, Protective type flanges coupling- Part drawing, Solid Modeling.	
CO4.	Applying Pipe fittings-Such as-Elbows-Reducers, T-Cross and Bibcock.	
CO5.	Applying I. C. engine piston, Simple bearing, Cotter and Knuckle joint, pulleys and flywheel Sectioned views.	
	LIST OF EXPERIMENTS:	
1:	**General Concept of Machine Drawing:** **(a)** Views and sections (Full and half), dimensioning. Technique -Unidirectional and aligned practice conventions as per latest code of practice for general engineering drawing. General concept of IS working drawing symbols for: **(i)** Welding & Riveting. **(ii)** Screws & Screw threads. **(iii)** Surface Finish Marks. **(iv)** Limits, Fits & Tolerances.	
2:	**(b) Sectioned View of:** **(i)** Foundation bolts. **(ii)** Pipe Joints - Flanged, Socket.	
3:	**(c) Assembly Drawing of:** **(i)** Knuckle joint- Part drawing, Solid Modeling, Assembly and Sectioning. **(ii)** Protective type flange coupling- Part drawing, Solid Modeling, Assembly and Sectioning.	
4:	**(d) Assembly drawing from detail and vice versa:** **(i)** Screw jack.	
5	**(e) Spur gear profile drawing from given data Free hand sketching of:** **(i)** Pipe fittings-Such as-Elbows-Reducers, T-Cross and Bibcock. **(ii)** I. C. engine piston, Simple bearing, Cotter and Knuckle joint, pulleys and flywheel Sectioned views. **(iii)** Cutting tools of Lathe machine, shaper and common milling cutters. **(iv)** Gear puller and C-clamp **(v)** Sketching of orthographic views from isometric views is practiced.	

Evaluation of Practical Examination:

Internal Evaluation (50 marks):

Each experiment would be evaluated by the faculty concerned on the date of the experiment on a 4-point scale which would include the practical conducted by the students and a Viva taken by the faculty concerned. The marks shall be entered on the index sheet of the practical file.

Evaluation Scheme:

PRACTICAL PERFORMANCE & VIVA DURING THE SEMESTER (35 MARKS)	ON THE DAY OF EXAM (15 MARKS)

EXPERIMENT (5 MARKS)	FILE WORK (10 MARKS)	ATTENDANCE (10MARKS)	VIVA (10MARKS)	EXPERIMENT (5 MARKS)	VIVA (10 MARKS)

External Evaluation (50marks):

The external evaluation would also be done by the external Examiner based on the experiment conducted during the examination:

EXPERIMENT (20 MARKS)	FILE WORK (10 MARKS)	VIVA (20MARKS)	TOTAL EXTERNAL (50MARKS)

Hiranmoy Kumar

Study & Evaluation Scheme

of

Bachelor of Technology
Mechanical Engineering
(Specialization in Mechatronics)

[Applicable w.e.f. Academic Session - 2023-24 till revised]

[As per CBCS guidelines given by AICTE]

Accredited With NAAC A Grade

12-B Status from UGC

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

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TEERTHANKER MAHAVEER UNIVERSITY
(Established under Govt. of U.P. Act No. 30, 2008)
Delhi Road, Bagarpur, Moradabad (U.P.)

Study & Evaluation Scheme	
SUMMARY	
Institute Name	*Faculty of Engineering*
Programme	*B.Tech. (Mechanical Engineering)*
Duration	*Four-year full time (Eight Semesters)*
Medium	*English*
Minimum Required Attendance	*75%*
Credits	
Maximum Credits	*193*
Minimum Credits Required for Degree	*188*

Assessment:

Evaluation	Internal	External	Total
Theory	40	60	100
Practical/ Dissertations/ Project Reports/ Viva-Voce	50	50	100

Class Test-1	Class Test-2	Class Test-3	Assignment(s)	Attendance & Participation	Total
Best two out of three					
10	10	10	10	10	40

Duration of Examination	External	Internal
	3 Hours	1.5 Hours

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation (i.e. both internal andexternal).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester.

 # Provision for delivery of 25% content through online mode.

Policy regarding promoting the students from semester to semester & year to year. No specific condition to earn the credit for promoting the students from one semester to next semester.

Maximum no of years required to complete the program: N+2 (N=No of years for program)

Question Paper Structure	
1	*The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.*
2	*Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.*
3	*The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.*
IMPORTANT NOTES:	
1	*The purpose of examination should be to assess the Course Outcomes (CO) that will ultimately lead to of attainment of Programme Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (Reference to Bloom's Taxonomy).*
2	*Case Study Is essential in every question paper (wherever it is being taught as a part of pedagogy) for evaluating higher-order learning. Not all the courses might have case teaching method used as pedagogy.*
3	*There shall be continuous evaluation of the student and there will be a provision of fortnight progress report.*

Program Structure-B.Tech. (Mechanical Engineering)
(Specialization in Mechatronics)

A. Introduction:

Mechanical Engineering is a backbone of various developments and innovations. It uses scientific principles to design and build machines/tools, processes, products, structures and other desired things. B.Tech. in Mechanical Engineering programme has wide scope as it gives job opportunities in local to international companies and secures life-long rewarding career. Curriculum for Mechanical Engineering degree prepare the students to work in the vast range of sectors including automotive, energy, production, fabrication, power plants, metal industries etc. in design, projects, operations, manufacturing, and maintenance domains. The curriculum is so designed that the students can gain an in-depth knowledge of the engineering disciplines and applied functional areas necessary to meet the requirements of the industry.

Students will develop and gain various skills that are transferable within the engineering world and practical skills that are equally useful in plenty of other sectors. Problem-solving skills are honed, and their interpersonal and communication skills will also improve with the amount of team work that they will be required to do. Students will also learn how to better manage their time and resources and assess the risks involved in a certain project. Other useful skills that they will learn include design, leadership and organizational skills.

The institute emphasis on the following courses ***balanced with core and elective courses:*** The curriculum of B.Tech.. program emphasizes an intensive, flexible engineering education with 193 credits. Total 193 credits are allotted for the B.Tech.. degree.

The programme structure and credits for B.Tech. are finalized based on the stakeholders' requirements and general structure of the programme. Minimum number of class-room contact teaching credits for the B.Tech. program will be 193 credits (one credit equals 1.0 hour) and Project/internship will be of 12 credits. However, the minimum number of the credits for award of B.Tech. degree will be 188 credits. Out of 181 credits of classroom contact teaching, 64 credits are to be allotted for core courses (PCC), 16 credits are allotted to Basic Science Courses (BSC), 14 credits are allotted to Engineering Science Courses (ESC), 35 credits are allotted to AECC-Ability Enhancement Compulsory Course, 06 credits are allotted to open elective courses (OEC), 17 credits are allotted to Professional Elective courses (PEC), 06 credits are allotted to Skill Enhancement Course (SEC) and rest of 23 credits for Laboratory courses. Credits distribution is given below in tabular form:

B.Tech. Mechanical Engineering: Four-Year (8-Semester) CBCS Programme			
Basic Structure: Distribution of Courses			
S. No.	**Type of Course**	**Credit**	**Total Credits**
1	BSC - Basic Science Courses	4 Courses of 4 Credits each (Total Credit 4X4)	16
2	ESC - Engineering Science Courses	2 Courses of 4 Credits each (Total Credit 2X4) 2 Courses of 3 Credits each (Total Credit 2X3)	14
3	PCC - Professional core courses	8 Courses of 3 Credits each (Total Credit 8X3) 10 Courses of 4 Credits each (Total Credit 10X4)	64
4	PEC - Professional Elective courses	4 Courses of 4 Credits each (Total Credit 4X4) 1 Course of 1 Credits each (Total Credit 1X1)	17
5	OEC - Open Elective courses	2 Course of 3 Credits each (Total Credit 2X3)	06
6	Skill Enhancement Course (SEC)	6 Courses of 1 Credits each (Total Credit 6X1)	06
7	LC - Laboratory course	19 Courses of 1 Credits each (Total Credit 19X1) 2 Courses of 2 Credits each (Total Credit 2X2)	23
8	AECC-Ability Enhancement Compulsory Course	2 Course of 3 Credits each (Total Credit 2X3) 2 Course of 2 Credits each (Total Credit 2X2) 5 Course of 5 Credits each (Total Credit 5X5)	35
9	PROJ-Viva Voce for Dissertation and Skill based practical training & Industrial Training Report	1 Course of 5 Credits each (Total Credit 1X5) 1 Course of 3 Credits each (Total Credit 1X3) 2 Course of 2 Credits each (Total Credit 2X2)	12
11	MOOC-Optional (credits will consider only in case a student fails to secure minimum required credits for the award of degree)	As per the approval of Hon'ble Vice Chancellor	-
Total Credits			**193**

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

B. Tech (Honours) Programme:

A new academic programme B.Tech. (Hons.) is introduced in order to facilitate the students to choose additionally the specialized courses of their choices and build their competence in a specialized area. The features of the new programme, include:

1. B.Tech. Student in regular stream can opt for B.Tech. (Hons.), provided he/she passed in all courses with minimum aggregate 75% marks up to the end of second semester.
2. For B. Tech (Hons), Student needs to earn additional 24 credits (over and above the required minimum 180 credits) relevant to her/his discipline as recommended by the faculty advisor.
3. The students opting for this program have to take four additional courses of their specialization of a minimum of 2 credits each from 3rd to 8th semesters.

4. The faculty advisor will suggest the additional courses to be taken by the students based on their choice and level of their academic competence.
5. The list of such additional courses offered by the NPTEL will be approved by the Honorable Vice Chancellor in the beginning of the academic year to facilitate the registration process.
6. The student can also opt for post graduate level courses.
7. The students have to submit the NPTEL course completion certificate to exam division for considering as B.Tech. (Hons)

• Student should have to take permission of registration for the B.Tech.. (Hons.) degree from Honorable Vice Chancellor in starting of third semester.

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his/her target number of credits as specified by the AICTE/UGC and adopted by our university.

The following is the course module designed for the B.Tech.. program:

- ***Program Core Course (PCC):*** Core courses of B.Tech.. program will provide a holistic approach to engineering education, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish technical knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.
  The core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the society at large.
  A wide range of core courses provides groundwork in the field of thermo-fluids, engineering designs, industrial and production engineering etc.
  We offer core courses in semester III, IV, V, VI, VII &VIII during the B.Tech.- Mechanical program. There will be 3 or 4 credits for each core course offered depending upon the course content.

- ***Open Elective Course (OEC):*** Open Elective is an interdisciplinary additional subject that is compulsory in a program. The score of Open Elective is counted in the overall aggregate marks under Choice Based Credit System (CBCS). Each Open Elective paper will be of 3 Credits in VII and VIII semesters. Each student has to take Open/Generic Electives from department other than the parent department. Core / Discipline Specific Electives will not be offered as Open Electives.

- ***Ability Enhancement Compulsory Course (AECC):*** This is a compulsory course that does not have any choice and will be of 2, 3, 5 credits. Each student of B.Tech.. Program has to compulsorily pass the Environmental Studies and acquire 3 credits.

- ***Skill Enhancement Course (SEC):*** An Skill Enhancement Course is a credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be four courses of Aptitude in Semester III, IV, V & VI semesters and two courses of Soft Skills in V &VI Semesters and will carry 2 credits, as compulsory for every student to pass these courses with minimum 45% marks.

- ***Professional Elective courses (PEC):*** The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain like thermo-fluids, designing, industrial, production management etc. It will be covered in two semesters (VII &VIII) of fourth year of the program relevant to chosen disciplines of core courses of the program. The student will have to choose any four theories and one lab out of the given list of specialization offered. Each theory of 4 credits and lab with one credit is opting by students.

C. Program Outcomes for Engineering:

PO – 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO – 2	**Problem analysis& Solving:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO – 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO – 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO – 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO – 6	**Social Interaction & effective citizenship:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO – 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO – 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO – 9	**Attitude (Individual and team work):** Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
PO – 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clean instructions.
PO – 11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO – 12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO-13	**Entrepreneurship:** An Entrepreneurship cut across every sector of human life including the field of engineering, engineering entrepreneurship is the process of harnessing the business opportunities in engineering and turning it into profitable commercially viable innovation.

PO-14	**Interpersonal skills:** Interpersonal skills involve the ability to communicate and build relationships with others. Effective interpersonal skills can help the students during the job interview process and can have a positive impact on your career advancement.
PO-15	**Technology savvy/usage:** Being technology savvy is essentially one's skill to be smart with technology. This skill reaches far beyond 'understanding' the concepts of how technology works and encompasses the 'utilization' of such modern technology for the purpose of enhancing productivity and efficiency.

D. Programme Specific Outcomes (PSOs)

The learning and abilities or skills that a student would have developed by the end of four-year **B.Tech.. Program:**

PSO – 1	**Understanding** knowledge of mathematics, engineering and science to identify, formulate, analyse the engineering problems and find cost-effective and optimal solution of real-life problems.
PSO – 2	**Applying** mechanical engineering concepts and tools to solve complex engineering and industrial problems in the field of Manufacturing Engineering, Thermal Engineering and Design Engineering.
PSO – 3	**Analysing** managerial and entrepreneurial skills to work effectively in multidisciplinary teams for building nation and helping society by following ethical and environmentally friendly practices.
PSO – 4	**Evaluating** the need of lifelong learning and will engage in learning modern techniques and engineering tools like CAD, Solid Works, CNC machining, 3D printing etc.
PSO – 5	**Creating** positive attitude for conducting experiments and developing new concepts on emerging fields.

E. Pedagogy & Unique practices adopted:

"Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will emphasize on experiential learning.

- ***Audio-Visual Based Learning:*** These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through video lectures. In fact, many teachers give examples from movies during their discourses. Making students learn few important theoretical concepts through Audio visual Aids is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting *Audio-Visual Based Learning* wherever possible.
- ***Field / Live Projects*:** The students, who take up experiential projects in companies, where senior executives with a stake in teaching guide them, drive the learning. All students are encouraged to do some live project other than their regular classes.
- ***Industrial Visits:*** Industrial visit are essential to give students hand-on exposure and experience of how things and processes work in industries. Our institute organizes such visits to enhance students' exposure to practical learning and work out for a report of such a visit relating to their specific topic, course or even domain.
- ***MOOCs:*** Students may earn credits by passing MOOCs as decided by the college. Graduate level programs may award Honors degree provided students earn pre-requisite credits through MOOCs.

University allows students to undertake additional subjects/course(s) (In-house offered by university through collaborative efforts or courses in the open domain by various internationally recognized universities) and to earn additional credits on successful completion of the same. Each course will be approved in advance by the University following the standard procedure of approval and will be granted credits as per the approval.

Keeping this in mind, University proposed and allowed a maximum of two credits to be allocated for each MOOC courses. In the pilot phase it is proposed that a student undertaking and successfully completing a MOOC course through only NPTEL could be given 2 credits for each MOOC course.

For smooth functioning and monitoring of the scheme the following shall be the guidelines for MOOC courses, Add-on courses carried out by the College from time to time.

a) This is recommended for every student to take at least one MOOC Course throughout the programme.
b) There shall be a MOOC co-ordination committee in the College with a faculty at the level of Professor heading the committee and all Heads of the Department being members of the Committee.
c) The Committee will list out courses to be offered during the semester, which could be requested by the department or the students and after deliberating on all courses finalize a list of courses to be offered with 2 credits defined for each course and the mode of credit consideration ofthe student. The complete process shall be obtained by the College before end of June and end of December for Odd and Even semester respectively of the year in which the course is being offered. In case of MOOC course, the approval will be valid only for the semester on offer.
d) Students will register for the course and the details of the students enrolling under the course along with the approval of the Vice Chancellor will be forwarded to the Examination department within fifteen days of start of the semester by the Coordinator MOOC through the Principal of the College.
e) After completion of MOOC course, Student will submit the photo copy of Completion certificate of MOOC Course to the Examination cell as proof.
f) Marks will be considered which is mentioned on Completion certificate of MOOC Course.
g) College will consider the credits only in case a student fails to secure minimum required credits then the additional subject(s) shall be counted for calculating the minimum credits required for the award of degree.

- ***Special Guest Lectures (SGL) & Extra Mural Lectures (EML):*** Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry we organize such lectures, as part of lecture-series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and insights.

- ***Student Development Programs (SDP):*** Harnessing and developing the right talent for the right industry an overall development of a student is required. Apart from the curriculum teaching various student development programs (training programs) relating to soft skills, interview skills, SAP, Advanced excel training etc. that may be required as per the need of the student and industry trends, are conducted across the whole program. Participation in such programs is solicited through volunteering and consensus.

- ***Industry Focused programs:*** Establishing collaborations with various industry partners to deliver the programme on sharing basis. The specific courses are to be delivered by industry experts to provide practice-based insight to the students.

- ***Special assistance program for slow learners & fast learners:*** There is a provision of identify slow learners; develop the mechanism to correcting knowledge gap through result analysis of various class tests. Extra classes will be arranged for slow learners and facilitate them with required study material. There are some terms of advance topics what learning challenging it will be provided to the fast learners.

- ***Induction program:*** Every year 3 weeks induction program is organized for 1st year students to make them familiarize with the entire academic environment of university including Curriculum, Classrooms, Labs, Faculty/ Staff members, Academic calendar and various activities.

- **Mentoring scheme:** There is Mentor-Mentee system. One mentor lecture is provided per week in a class. Students can discuss their problems with mentor who is necessarily a teaching faculty. In this way, student's problems or issues can be identified and resolved.

- **Extra-curricular Activities:** Organizing& participation in extracurricular activities will be mandatory to help students develop confidence & face audience boldly. It brings out their leadership qualities along with planning & organizing skills. Students undertake various cultural, sports and other competitive activities within and outside then campus. This helps them build their wholesome personality.

- **Career &Personal Counseling:** - Identifies the problem of student as early as possible and gives time to discuss their problems individually as well as with the parents. Counseling enables the students to focus on behavior and feelings with a goal to facilitate positive change.
  Its major role lies in giving: Advice, Help, Support, Tips, Assistance, and Guidance.
  Strategies: a) Once in a week the counselors meet the students in order to inquire about problems.
  b) Available 24x7 on SOS basis.

- **Participation in Workshops, Seminars & writing & Presenting Papers:** Departments plan to organize the workshops, Seminars & Guest lecturers time to time on their respective topics as per academic calendar. Students must have to attend these programs. This participation would be count in the marks of general Discipline & General Proficiency which is the part of course scheme as non-credit course.

- **Formation of Student Clubs, Membership &Organizing& Participating events:** Every department as the departmental clubs with the specific club name. The entire student's activity would be performed by the club. One faculty would be the coordinator of the student clubs & students would be the members with different responsibility.

- **Capability Enhancement & Development Schemes:** The Institute has these schemes to enhance the capability and holistic development of the students. Following measures/ initiatives are taken up from time to time for the same: Career Counseling, Soft skill development, Remedial Coaching, Bridge Course, Language Lab, Yoga and Meditation, Personal Counseling

- **Library Visit & Utilization of E-Learning Resources:** Student can visit the library from morning 10 AM to evening 8 PM. Library created its resources Database and provided Online Public Access Catalogue (OPAC) through which users can be accessed from any of the computer connected in the LAN can know the status of the book. Now we are in process to move from OPAC to KOHA.
  a) Institute Library & Information is subscribing online e-books and e-journals databases (DELNET and EBSCO host E-databases) as per the requirement of the institute and fulfilling AICTE norms. IP based access is given to all computers connected on campus LAN to access e-journals.
  b) For the effective utilization of resources, Information Literacy training programs are conducted to the staff and students.
  c) Wi-Fi enabled campus
  d) Regular addition of latest books and journals
  e) Well maintained e-library to access e-resources

Study & Evaluation Scheme

B.Tech. Mechanical Engineering

Semester I

S. No	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	BSC-1	EAS116	Engineering Mathematics-I	3	1	-	4	40	60	100
2	BSC-2	EAS112/212	Engineering Physics	3	1	-	4	40	60	100
		EAS113/213	Engineering Chemistry							
3	ESC-1	EEE117/217	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC111/211	Basic Electronics Engineering							
4	AECC-1	TMU101	Environmental Studies	2	1	-	3	40	60	100
5	AECC-2	TGE103	English Communication- I	1	-	2	2	40	60	100
6	LC-1	EAS162/262	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS163/263	Engineering Chemistry (Lab)							
7	LC-2	EEE161/261	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC161/261	Basic Electronics Engineering (Lab)							
8	LC-3	EME161/261	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME162/262	Workshop Practice (Lab)							
9	DGP-1	EGP111	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**12**	**4**	**10**	**21**	**450**	**450**	**900**

Semester II

S. No	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	BSC-3	EAS211	Engineering Mathematics-II	3	1	-	4	40	60	100
2	BSC-4	EAS212/112	Engineering Physics	3	1	-	4	40	60	100
		EAS213/113	Engineering Chemistry							
3	ESC-2	EEE217/117	Basic Electrical Engineering	3	1	-	4	40	60	100
		EEC211/111	Basic Electronics Engineering							
4	ESC-3	ECS212	Computer System & Programming in C++	3	-	-	3	40	60	100
5	AECC-3	TMUTGE201	Business English	1	-	2	2	40	60	100
6	LC-4	EAS262/162	Engineering Physics (Lab)	-	-	2	1	50	50	100
		EAS263/163	Engineering Chemistry (Lab)							
7	LC-5	EEE261/161	Basic Electrical Engineering (Lab)	-	-	2	1	50	50	100
		EEC261/161	Basic Electronics Engineering (Lab)							
8	LC-6	ECS262	Computer System &Programming in C++ (Lab)	-	-	2	1	50	50	100
9	LC-7	EME261/161	Engineering Drawing (Lab)	-	-	4	2	50	50	100
		EME262/162	Workshop Practice (Lab)							
10	DGP-2	EGP211	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**13**	**3**	**12**	**22**	**500**	**500**	**1000**

B.Tech. Mechanical Engineering - Semester III

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	
1	PCC-1	EME311	Engineering Mechanics	3	1	-	4	40	60	100
2	PCC-2	EME312	Engineering Thermodynamics	3	1	-	4	40	60	100
3	PCC-3	EME313	Material Science	3	1	-	4	40	60	100
4	PCC-4	EME314	Industrial Engineering	3	-	-	3	40	60	100
5	AECC (SP)-4	TMUTGE301	**Design Thinking**	**3**	**1**	**1**	**5**	**40**	**60**	**100**
6	LC-8	EME361	Machine Drawing (Lab)	-	-	2	1	50	50	100
7	LC-9	EME362	Engineering Thermodynamics (Lab)	-	-	2	1	50	50	100
8	LC-10	EME363	Material Science (Lab)	-	-	2	1	50	50	100
9	SEC-1	TGC307	Foundation in Quantitative Aptitude	-	-	2	1	50	50	100
10	DGP-3	EGP311	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**15**	**4**	**9**	**24**	**500**	**500**	**1000**

Following additional Course for Lateral Entry Students with B.Sc./Polytechnic background to be taken in III semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME161/261	Engineering Drawing (Lab)	-	-	4	-	50	50	100
2		TMU101	Environmental Studies	2	1	-	-	40	60	100

B.Tech. Mechanical Engineering - Semester IV

S. No.	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-5	EME411	Strength of Materials	3	1	-	4	40	60	100
2	PCC-6	EME412	Production Technology-I	3	1	-	4	40	60	100
3	PCC-7	EME413	Measurement, Metrology & Control	3	1	-	4	40	60	100
4	PCC-8	EME414	Fluid Mechanics	3	-	-	3	40	60	100
5	AECC (SP)-5	ETS401	CAD for 3D Design	3	1	1	5	40	60	100
6	LC-11	EME461	Production Technology-I (Lab)	-	-	2	1	50	50	100
7	LC-12	EME462	Measurement, Metrology & Control (Lab)	-	-	2	1	50	50	100
8	LC-13	EME463	Fluid Mechanics (Lab)	-	-	2	1	50	50	100
9	SEC-2	TGC407	Analytical Reasoning	-	-	2	1	50	50	100
10	DGP-4	EGP411	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	15	4	9	24	500	500	1000

*Skill based Training/Internship of 4 weeks duration from a reputed Industry/organization after completion of 4th semester end-semester examination.

Following additional Courses for Lateral Entry Students with B.Sc./Polytechnic background to be taken in IV semester and all should pass with minimum of 45% marks for obtaining the degree: credits will not be added

1	LC	EME162/262	Workshop Practice (Lab)	-	-	4	-	50	50	100

B.Tech. Mechanical Engineering - Semester V

S. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-9	EME511	Production Technology –II	3	1	-	4	40	60	100
2	PCC-10	EME512	Dynamics of Machines	3	-	-	3	40	60	100
3	PCC-11	EME513	Heat & Mass Transfer	3	-	-	3	40	60	100
4	PCC-12	EME515	Power Plant Engineering	3	-	-	3	40	60	100
5	**AECC (SP)-6**	**ETS501**	**Design for Additive Manufacturing**	**3**	**1**	**1**	**5**	**40**	**60**	**100**
6	AECC-7	EHM513	Human values & Professional Ethics	3	-	-	3	40	60	100
7	LC-14	EME561	Production Technology-II (Lab)	-	-	2	1	50	50	100
8	LC-15	EME562	Dynamics of Machines (Lab)	-	-	2	1	50	50	100
9	LC-16	EME563	Heat & Mass Transfer (Lab)	-	-	2	1	50	50	100
10	PROJ-1	EME592	Skill based Practical Training & Presentation	-	-	-	2	50	50	100
11	SEC-3	TGC507	Modern Algebra and Data Management	-	-	2	1	50	50	100
12	SEC-4	TGC502	Self Management for Engineers	-	-	2	1	50	50	100
13	DGP-5	EGP511	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**18**	**2**	**11**	**28**	**640**	**660**	**1300**

MOOC Course:

1	MOOC-1	MOOC01	MOOC Program -1 (Optional)	-	-	-	2	-	100	100

B.Tech. Mechanical Engineering - Semester VI

Sl. No	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	PCC-13	EME611	Refrigeration & Air Conditioning	3	1	-	4	40	60	100
2	PCC-14	EME612	Mechanical Vibrations	3	-	-	3	40	60	100
3	PCC-15	EME613	Design of Machine Elements	3	-	-	3	40	60	100
4	**AECC (SP)-8**	**ETS601**	**Industrial Mechatronics System**	**3**	**1**	**1**	**5**	**40**	**60**	**100**
5	PCC-16	EME614	Renewable Energy Resources	3	1	-	4	40	60	100
6	ESC-4	EHM611	Operations Management	3	-	-	3	40	60	100
7	LC-17	EME661	Refrigeration & Air Conditioning (Lab)	-	-	2	1	50	50	100
8	LC-18	EME662	Solid Works (Lab)	-	-	2	1	50	50	100
9	SEC-5	TGC607	Advance Algebra and Geometry	-	-	2	1	50	50	100
10	SEC-6	TGC602	Workplace Management for Engineers	-	-	2	1	50	50	100
11	DGP-6	EGP611	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**18**	**3**	**9**	**26**	**540**	**560**	**1100**

*Industrial Training of 6 weeks duration from a reputed Industry/organization after completion of 6th semester end-semester examination.

MOOC Course:

1	MOOC-2	MOOC02	MOOC Program –II (Optional)	-	-	-	2	-	100	100

B.Tech. Mechanical Engineering - Semester VII

S. No.	Category	Course Code	Course	Periods			Evaluation Scheme			
				L	T	P	Credit	Internal	External	Total
1	AECC (SP)-9	ETS701	Robotics for Real World Applications	3	1	1	5	40	60	100
2	PCC-17	EME712	IC Engines	3	-	-	3	40	60	100
3	PEC-1		Program Elective: Program Elective-I	3	1	-	4	40	60	100
4	PEC-2		Program Elective: Program Elective-II	3	1	-	4	40	60	100
5	OEC-1		Open Elective: Open Elective-I	3	-	-	3	40/50	60/50	100
6	LC-19	EME761	Computer Aided Design (Lab)	-	-	2	1	50	50	100
7	LC-20	EME762	IC Engines (Lab)	-	-	2	1	50	50	100
8	PROJ-2	EME792	Industrial Training & Presentation	-	-	-	2	50	50	100
9	PROJ-3	EME798	Project Work Phase-I	1	-	8	5	100	-	100
10	DGP-7	EGP711	Discipline & General Proficiency	-	-	-	-	100	-	100
			Total	**16**	**3**	**13**	**28**	**550/560**	**450/440**	**1000**

MOOC Course:

1	MOOC-3	MOOC03	MOOC Program –III (Optional)	-	-	-	2	-	100	100

B.Tech. Mechanical Engineering - Semester VIII

S. No	Category	Course Code	Course		Periods			Evaluation Scheme			
					L	T	P	Credit	Internal	External	Total
1	PCC-18	EME811	Computer Aided Manufacturing (CAM)		3	1	-	4	40	60	100
2	PEC-3		Program Elective	Program Elective-III	3	1	-	4	40	60	100
3	PEC-4			Program Elective-IV	3	1	-	4	40	60	100
4	PEC-5		Program Elective (Lab)	Program Elective-V	-	-	2	1	50	50	100
5	OEC-2		Open	Open Elective-II	3	-	-	3	40/50	60/50	100
6	LC-21	EME861	Computer Aided Manufacturing (CAM) (Lab)		-	-	2	1	50	50	100
7	PROJ-4	EME898	Project Work Phase –II		1	-	4	3	50	50	100
8	DGP-8	EGP811	Discipline & General Proficiency		-	-	-	-	100	-	100
			Total		13	3	08	20	410/420	390/380	800

MOOC Course:

1	MOOC-4	MOOC04	MOOC Program –IV (Optional)	-	-	-	2	-	100	100

ELECTIVE COURSES OFFERED

S. No	Code	Course	L	T	P	Credit
Semester VII- Program Elective I (Thermal Engineering) (Any one)						
1	EME716	Automobile Engineering	3	1	0	4
2	EME717	Energy Conservation	3	1	0	4
3	EME715	Gas Dynamics	3	1	0	4
Semester VII- Program Elective II (Any one)						
4	EME714	Hydraulic Machines	3	1	0	4
5	EHM735	Industrial Sociology	3	1	0	4
6	EHM736	Principles of Management and Organizational Behaviour	3	1	0	4
7	EHM734	Engineering and Managerial Economics	3	1	0	4
Semester VIII- Program Elective III (Advanced Manufacturing Systems) (Any one)						
8	EME812	Unconventional Manufacturing Process	3	1	0	4
9	EME813	Mechatronics	3	1	0	4
Semester VIII- Program Elective IV (Product development and Quality control) (Any one)						
10	EME814	Product Design and Value Engineering	3	1	0	4
11	EHM832	Total Quality Management	3	1	0	4
12	EME816	Maintenance Engineering	3	1	0	4
Semester VIII- Program Elective V (Advanced Manufacturing systems Labs) (Any one)						
13	EME862	Unconventional Manufacturing Process (Lab)	0	0	2	1
14	EME863	Mechatronics (Lab)	0	0	2	1

Study & Evaluation Scheme

of

Diploma in Mechanical (Automobile/Production/Refrigeration & Air-Conditioning) Engineering

[Applicable w.e.f. Academic Session - 2023-24]

[As per CBCS guidelines given by UGC]

Accredited with NAAC A Grade

12-B Status from UGC

TEERTHANKER MAHAVEER UNIVERSITY

N.H.-24, Delhi Road, Moradabad, Uttar Pradesh-244001

Website: www.tmu.ac.in

Study & Evaluation Scheme	
SUMMARY	
Institute Name	Faculty of Engineering, T.M.U., Moradabad
Program	Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-conditioning)
Duration	Three Years full time(Six Semesters)
Medium	English/Hindi
Minimum Required Attendance	75%
Credits	
Maximum Credits	167
Minimum Credits Required for Diploma	163

Assessment:

Evaluation	Internal	External	Total
Theory	40	60	100
Practical/ Dissertations/ Project reports/ Viva- Voce	50	50	100

Class Test-1	Class Test-2	Class Test-3	Assignment(s)	Attendance & Participa tion	Total
Best two out of three					
10	10	10	10	10	40

Duration of Examination	External	Internal
	3 Hours	1.5 Hours

To qualify the course a student is required to secure a minimum of 45% marks in aggregate including the semester end examination and teachers continuous evaluation. (i.e. both internal and external).A candidate who secures less than 45% of marks in a course shall be deemed to have failed in that course. The student should have at least 45% marks in aggregate to clear the semester.

Question Paper Structure	
1	The question paper shall consist of six questions. Out of which first question shall be of short answer type (not exceeding 50 words) and will be compulsory. Question no. 2 to 6 (from Unit-I to V) shall have explanatory answers (approximately 350 to 400 words) along with having an internal choice within each unit.
2	Question No. 1 shall contain 8 parts from all units of the syllabus with at least one question from each unit and students shall have to answer any five, each part will carry 2 marks.
3	The remaining five questions shall have internal choice within each unit; each question will carry 10 marks.
IMPORTANT NOTES:	
1	The purpose of examination should be to assess the Course Outcomes (CO) that will ultimately lead to of attainment of Program Specific Outcomes (PSOs). A question paper must assess the following aspects of learning: Remember, Understand, Apply, Analyze, Evaluate & Create (reference to Bloom's Taxonomy).
2	There shall be continuous evaluation of the student.

Program Structure – Diploma in Engineering

A. Introduction:

Diploma in Engineering is a backbone of all innovation to build the nation, by imparting quality skill development and training in emerging field. It achieve excellence in innovation simultaneously respond to the demand of the society by engaging in lifelong learning and earning. They usually involve in analyzing and providing solutions to real life situations.

Diploma in Engineering program has evergreen scope as it gives enormous job opportunities from local to international companies and secures life-long career. Today no technical innovation is possible without the help of core branches of Diploma in Engineering i.e. Civil, Computer, Electronics, Electrical and Mechanical. Curriculum for Diploma in engineering degree trains the students to work in the vast range of Engineering sectors. To develop understanding of scientific principles and analytical ability, its curriculum starts with courses in basic sciences. These are followed by courses in engineering sciences to offer a smooth transition from basic sciences to professional Diploma in Engineering courses. Teaching of subjects in Basic Sciences and Humanities incorporated to develop appreciation of the impact and scope of science and technology on society. Attention is also paid to develop communication skills in English language. In addition, the program consisted of six semesters not only includes teaching of core courses but also includes program elective, field work/project, value added and open elective courses. The University strives to cultivate among its students a strong desire and capacity for continuous learning as well as self-appraisal to develop sterling human & professional qualities and a strong sense of service to society through designed, curricular, co-curricular activities and congenial campus environment.

After completing their Diploma in Engineering, students hold lucrative opportunities in many renowned industries, some launch their own start-ups, while some appears for B. Tech. to pursue higher studies in the chosen specializations. Diploma in Engineering holders will have ample opportunities in industries like Telecommunication, Automobile and Electronics equipment manufacturing, production, construction in real states etc. It has application right from manufacturing plants, vehicles, ships, robots, heating and cooling systems, aircrafts, even in medical devices. Mechanical engineers are generally hired by manufacturing industries, defense, PWD and Telegraphs etc. Electronic and electrical engineers have opportunities in many industries, with the main areas being in electronics, IT, manufacturing, power, transport, construction, telecommunications, research and development, and petrochemicals. Civil engineers have abundant chances in construction of new set up and building in real state.

Each branch specific in Diploma in Engineering not only provides the environment of solutions to the problems faced by human being but also facilitates the universe with advance technology. Diploma in Engineering demands creativity, technical, analytical and problem solving skills as whole sole interest to soar high in this career. Engineers are considered as creator and innovator of advancements in future. So be the part of Diploma in engineering society and be the creator and innovator!!!

Contact hours include work related to Lecture, Tutorial and Practical (LTP), where our institution will have flexibility to decide course wise requirements.

Diploma in Mechanical engineering (Automobile/Production/Refrigeration & Air-Conditioning) : Three-Years (6-Semester) CBCS Program			
Basic Structure: Distribution of Courses			
S. No.	**Type of Course**	**Credit Hours**	**Total Credits**
1	Core Course (CC)	10 Courses of 4 Credit each (Total Credit 10X4) 2 Courses of 2 Credit each (Total Credit 2X2) 8 Courses of 1 Credit each (Total Credit 8X1)	52
2	Discipline Specific Course (DSC)	12 Courses of 4 Credit each (Total Credit 12X4) 1 Courses of 3 Credit each (Total Credit 1X3) 3 Courses of 2 Credit each (Total Credit 3X2) 7 Courses of 1 Credit each (Total Credit 7X1)	64
3	Ability-Enhancement Compulsory Course (AECC)	4 Courses of 3 Credit each (Total Credit 4X3) 2 Courses of 2 Credit each (Total Credit 2X2)	16
4	Generic Elective Course (GEC)	2 Courses of 3 Credit each (Total Credit 2X3)	06
5	Discipline Specific Elective Course (DSEC)	2Courses of 4 Credit each (Total Credit 2X4)	08
6	Skill Enhancement Course (SEC)	1 Courses of 8 Credit each (Total Credit 1X8) 1 Courses of 4 Credit each (Total Credit 1X4) 1 Courses of 3 Credit each (Total Credit 1X3) 1 Courses of 6 Credit each (Total Credit 1X6) 4 Courses of 0 Credit each (Total Credit 4X0)	21
Total Credits			**167**

B. Choice Based Credit System (CBCS)

Choice Based Credit System (CBCS) is a versatile and flexible option for each student to achieve his target number of credits as specified by the UGC and adopted by our University.

The following is the course module designed for the Diploma Program:

Core Course (CC): Core courses of Diploma program will provide a holistic approach to Diploma in Engineering, giving students an overview of the field, a basis to build and specialize upon. These core courses are the strong foundation to establish engineering knowledge and provide broad multi-disciplined knowledge can be studied further in depth during the elective phase.

The Core courses will provide more practical-based knowledge, case-based lessons and collaborative learning models. It will train the students to analyze, decide, and lead-rather than merely know-while creating a common student experience that can foster deep understanding, develop decision-making ability and contribute to the engineering and community at large.

A wide range of Core courses with four credits hours each provides groundwork in the engineering disciplines: Applied Physics, Applied Chemistry, Applied Mathematics, Applied Mechanics, Computer Fundamentals, Internet & MS office, Basic Civil & Electrical Engineering, & Basic of Electronics and Mechanical Engineering, Physics Lab, Chemistry Lab, Electrical Engineering Lab, Electronics Engineering Lab Information Technology Lab & Workshop Practice etc. The integrated foundation is

important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries, and expand their understanding of various business fields.

We offer 10 Core courses with 4 credits, 08 Core Course with 1 credits and 2 Core courses with 2 Credits for each during the Diploma Program.

Ability Enhancement Compulsory Course (AECC): As per the guidelines of Choice Based Credit System (CBCS) for all Universities, including the private Universities, the Ability Enhancement Compulsory Course (AECC) is a course designed to develop the ability of students in communication (especially English) and other related courses where they might find it difficult to communicate at a higher level in their prospective job at a later stage due to lack of practice and exposure in the language, etc. Students are motivated to learn the theories, fundamentals and tools of communication which can help them develop and sustain in the corporate environment and culture.

Generic Elective Course (GEC): Generic Elective is an interdisciplinary additional subject that is compulsory in the fifth and sixth semester of a program. The score of Generic Elective is counted in your overall aggregate marks under Choice Based Credit System (CBCS). Each Generic Elective paper will be of 3 credits and students will have the choice of taking 2 GECs, one in each Semester V & VI. Each student has to take Generic Electives from department other than the parent department. Discipline Specific Electives will not be offered as Generic Electives.

Discipline Specific Course (DSC): These are discipline Specific course that do not have any choice and will be of different credits (4, 3, 2 & 1 credits) each. Each student of Diploma in engineering program has to compulsorily pass the discipline Specific course.

A wide range of Discipline Specific courses with four credits hours each provides groundwork in the engineering disciplines: Engineering materials and material science, Thermal engineering, Strength of Material & Hydraulics, Meteorology& Measuring Instruments, CAD, Machine Tool Technology, Production technology, Automobile Engineering ,Automobile Technology, Refrigeration & Air-conditioning, Manufacturing Process, Theory of Machine, Production Automation & some of lab courses related to above specific courses etc. The integrated foundation is important for students because it will not only allow them to build upon existing skills, but they can also explore career options in a range of industries, and expand their understanding of various business fields.

Skill Enhancement Course (SEC): An Skill Enhancement Course is a credit course which is basically meant to enhance general ability of students in areas like soft skills, quantitative aptitude and reasoning ability - required for the overall development of a student and at the same time crucial for industry/corporate demands and requirements. The student possessing these skills will definitely develop acumen to perform well during the recruitment process of any premier organization and will have the desired confidence to face the interview. Moreover, these skills are also essential in day-to-day life of the corporate world. The aim is to nurture every student for making effective communication, developing aptitude and a general reasoning ability for a better performance, as desired in corporate world. There shall be four courses of Aptitude in Semester III, IV semesters and two courses of Soft Skills in III, IV Semesters and will carry 1 credit, as compulsory for every student to pass these courses with minimum 45% marks.

Discipline Specific Elective Course (DSEC): The discipline specific elective course is chosen to make students specialist or having specialized knowledge of a specific domain like CNC Machine Technology, Heat and Mass Transfer, Total Quality Management etc. It will be covered in two semesters (V & VI) of Third year of the program relevant to chosen disciplines of compulsory/core courses of the program. The student will have to choose any one elective out of the three DSEC offered CNC Machine Technology, Heat and Mass Transfer, Total Quality Management, Production Planning and Control, I.C. Engine &Composite Materials. Each student will have to choose two discipline specific elective courses (DSECs) in all chosen; 1 in Semester V and 1 in Semester VI respectively. Each DSEC will carry 4 credits.

C. Program Outcomes (POs):

On completion of the 03 years diploma course in Mechanical Engineering the participants will be able to learn/do/perform the following:

PO – 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.
PO – 2	**Problem analysis & Solving:** Identify, formulate, research literature and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
PO – 3	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development.
PO – 4	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clean instructions.
PO – 5	**Entrepreneurship:** An Entrepreneurship cut across every sector of human life including the field of engineering, engineering entrepreneurship is the process of harnessing the business opportunities in engineering and turning it into profitable commercially viable innovation.
PO – 6	**Interpersonal skills:** Interpersonal skills involve the ability to communicate and build relationships with others. Effective interpersonal skills can help the students during the job interview process and can have a positive impact on your career advancement.
PO – 7	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
PO – 8	**Attitude (Individual and team work):** Function effectively as an individual, and as member or leader in diverse teams, and in multidisciplinary settings.
PO – 9	**Technology savvy/usage:** Being technology savvy is essentially one's skill to be smart with technology. This skill reaches far beyond 'understanding' the concepts of how technology works and encompasses the 'utilization' of such modern technology for the purpose of enhancing productivity and efficiency.
PO – 10	**Social Interaction & effective citizenship:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

D. Program Specific Outcomes (PSOs):

The learning and abilities or skills that a student would have developed bythe end of three-yearDiploma in Mechanical Engineering (Auto+ Production+ Refrigeration Air conditioning) Program:

PSO – 1	Understanding and applying the knowledge gained from Mathematics, Basic Computing, Basic Sciences and Social Sciences in the field of Mechanical Engineering problem.
PSO – 2	Understanding the theories, techniques, tools & equipment related to Mechanical machines, concept of Conventional machines, Manufacturing processes, Thermodynamic systems, the concept of CI & SI engines, Otto & Diesel cycles, concept of Refrigeration system & cycle.
PSO – 3	Applying the Mechanical design & Drawing Estimation, Hydraulic Machines, Trusses, Beams, Cam, follower & governor, Mechanical instruments & Measurement and control Systems, Maintenance servicing and overhauling of Refrigeration plant's and automobile's equipments.
PSO – 4	Analyzing the Mechanical engineering problems/defects in machines, equipments, distribution of power, Gear meshing, latest developments in the field of refrigeration, vapor compression refrigeration system, engine cooling systems, testing and performance of engine.
PSO – 5	Developing and implementing new ideas on Product design and development with the help of CAD, CNC Tools, while ensuring best manufacturing practices.

E. Pedagogy & Unique practices adopted: "Pedagogy is the method and practice of teaching, especially for teaching an academic subject or theoretical concept". In addition to conventional time-tested lecture method, the institute will **emphasize on experiential learning:**

1. Audio-Visual Based Learning: These days technology has taken a front seat and classrooms are well equipped with equipment and gadgets. Video-based learning has become an indispensable part of learning. Similarly, students can learn various concepts through video lectures. In fact, many teachers give examples from movies during their discourses. Making students learn few important theoretical concepts through Audio visual Aids is a good idea and method. The learning becomes really interesting and easy as videos add life to concepts and make the learning engaging and effective. Therefore, our institute is promoting *Audio-Visual Based Learning* wherever possible.

***2. Field / Live Projects*:** The students, who take up experiential projects in companies, where senior executives with a stake in teaching guide them, drive the learning. All students are encouraged to do some live project other than their regular classes.

3. Industrial Visits: Industrial visit are essential to give students hand-on exposure and experience of how things and processes work in industries. Our institute organizes such visits to enhance students' exposure to practical learning and work out for a report of such a visit relating to their specific topic, course or even domain.

4. Special Guest Lectures (SGL) & Extra Mural Lectures (EML): Some topics/concepts need extra attention and efforts as they either may be high in difficulty level or requires experts from specific industry/domain to make things/concepts clear for a better understanding from the perspective of the industry. Hence, to cater to the present needs of industry we organize such lectures, as part of lecture-series and invite prominent personalities from academia and industry from time to time to deliver their vital inputs and insights.

5. Student Development Programs (SDP): Harnessing and developing the right talent for the right industry an overall development of a student is required. Apart from the curriculum teaching various student development programs (training programs) relating to soft skills, interview skills, SAP, Advanced excel training etc. that may be required as per the need of the student and industry trends, are conducted across the whole program. Participation in such programs is solicited through volunteering and consensus.

7. Industry Focused programs: Establishing collaborations with various industry partners to deliver the program on sharing basis. The specific courses are to be delivered by industry experts to provide practice based insight to the students.

8. Special assistance program for slow learners & fast learners: There is a provision of identify slow learners; develop the mechanism to correcting knowledge gap through result analysis of various class tests. Extra classes will be arranged for slow learners and facilitate them with required study material. There are some terms of advance topics what learning challenging it will be provided to the fast learners.

9. Induction program: Every year 3 weeks induction program is organized for 1st year students to make them familiarize with the entire academic environment of university including Curriculum, Classrooms, Labs, Faculty/ Staff members, Academic calendar and various activities.

10. Mentoring scheme: There is Mentor-Mentee system. One mentor lecture is provided per week in a class. Students can discuss their problems with mentor who is necessarily a teaching faculty. In this way, student's problems or issues can be identified and resolved.

11. Competitive exam preparation: Students are provided with one class in every week for Competitive exams preparation.

12. Extracurricular Activities: Organizing & participation in extracurricular activities will be mandatory to help students develop confidence & face audience with care.

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

Diploma–Semester I

S. N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-1	DIP111	Applied Mathematics–I	4	0	0	4	40	60	100
2	CC-2	DIP112/ DIP113	Applied Physics/ Applied Chemistry	4	0	0	4	40	60	100
3	CC-3	DIP104/ DIP105	Basics of Electrical & Civil Engineering / Basics of Electronics & Mechanical Engineering	4	0	0	4	40	60	100
4	CC-4	DIP131/ DIP107	Computer Fundamentals, Internet & MS-Office/ Applied Mechanics	4	0	0	4	40	60	100
5	AECC-1	TGE104	English Communication-I	1	0	2	2	40	60	100
6	CC-5	DIP181/ DIP182	Physics Lab/Chemistry Lab	0	0	2	1	50	50	100
7	CC-6	DIP153/ DIP154	Electrical Engineering Lab /Electronics Engineering Lab	0	0	2	1	50	50	100
8	CC-7	DIP155/ DIP156	Information Technology Lab / Applied Mechanics Lab	0	0	2	1	50	50	100
9	CC-8	DIP187/ DIP188	Workshop Practice / Engineering Drawing	0	0	4	2	50	50	100
Total				**17**	**0**	**12**	**23**	**400**	**500**	**900**

Diploma – Semester II

S.N	Category	Course Code	Course	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-9	DIP201	Applied Mathematics–II	4	0	0	4	40	60	100
2	CC-10	DIP203/ DIP202	Applied Chemistry/ Applied Physics	4	0	0	4	40	60	100
3	CC-11	DIP205/ DIP204	Basics of Electronics &Mechanical Engineering / Basics of Electrical & Civil Engineering	4	0	0	4	40	60	100
4	CC-12	DIP207/ DIP231	Applied Mechanics / Computer Fundamentals, Internet & MS-Office	4	0	0	4	40	60	100
5	AECC-2	TGE204	English Communication-II	1	0	2	2	40	60	100
6	CC-13	DIP252/ DIP281	Chemistry Lab/ Physics Lab	0	0	2	1	50	50	100
7	CC-14	DIP254/ DIP253	Electronics Engineering Lab / Electrical Engineering Lab	0	0	2	1	50	50	100
8	CC-15	DIP256/ DIP255	Applied Mechanics Lab / Information Technology Lab	0	0	2	1	50	50	100
9	CC-16	DIP288/ DIP257	Engineering Drawing / Workshop Practice	0	0	4	2	50	50	100
Total				**17**	**0**	**12**	**23**	**400**	**500**	**900**

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

Diploma – Semester III

S. No.	Category	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	CC-17	DME301	Strength of Materials	4	0	0	4	40	60	100
2	CC-18	DME302	Hydraulics	4	0	0	4	40	60	100
3	DSC-1	DME303	Engineering Materials & Material Science	4	0	0	4	40	60	100
4	DSC-2	DME304	Thermal Engineering	4	0	0	4	40	60	100
5	CC-19	DME351	Strength of Materials Lab	0	0	2	1	50	50	100
6	CC-20	DME352	Hydraulics Lab	0	0	2	1	50	50	100
7	DSC-3	DME354	Thermal Engineering Lab	0	0	2	1	50	50	100
8	DSC-4	DME356	Material ScienceLab	0	0	2	1	50	50	100
9	SEC-1	DME 357	Minor Project	0	0	6	3	50	50	100
10	SEC-2	TDC301	Soft Skills for Technical Supervisors	0	0	2	1	50	50	100
11	SEC-3	TDC302	Elementary Arithmetic & Reasoning	0	0	2	1	50	50	100
12	SEC-4	DDGP301	Discipline & General Proficiency	0	0	0	0	100	0	100
Total				**16**	**0**	**18**	**25**	**610**	**590**	**1200**

*** Additional course for Lateral entry students with 10+2 / Intermediate.**

1	VAC-1	DIP359*	Concepts of Information System Lab	0	0	2	0	50	50	100

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

Diploma – Semester IV

S. No	Category	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-5	DME402	Metrology & Measuring Instruments	4	0	0	4	40	60	100
2	DSC-6	DME409	Machine Tool Technology	4	0	0	4	40	60	100
3	DSC-7	DME406	Theory of Machines	4	0	0	4	40	60	100
4	DSC-8	DME407	Manufacturing Processes	4	0	0	4	40	60	100
5	AECC-3	DIP403/ DIP308	Environment Studies	4	0	0	4	40	60	100
6	DSC-9	DME452	Metrology Lab	0	0	2	1	50	50	100
7	DSC-10	DME456	Mechanical Engineering Drawing Lab	0	0	4	2	50	50	100
8	DSC-11	DME457	Manufacturing Processes Lab	0	0	2	1	50	50	100
9	SEC-5	TDC402	Progressive Algebra and Data Management	0	0	2	1	50	50	100
10	SEC-6	TDC401	Soft Skills for Workplace for Technical Supervisors	0	0	2	1	50	50	100
11	SEC-7	DDGP401	Discipline & General Proficiency	0	0	0	0	100	0	100
Total				**20**	**0**	**12**	**26**	**550**	**550**	**1100**

*** Students will go for summer internship for 4-6 weeks**

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

Diploma – Semester V

S. No.	Category	Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-12	DME510	Computer Aided Design	4	0	0	4	40	60	100
2	DSC-13	DME506	Design & Estimation	4	0	0	4	40	60	100
3	AECC-4	DIP505	Human values and professional ethics	4	0	0	4	40	60	100
4	DSC-14	DME557	Machine Shop Practice	0	0	6	3	50	50	100
5	DSC-15	DME563	CAD LAB	0	0	4	2	50	50	100
Specialization I			**Production Engineering**							
6	DSC-16	DME504	Production Technology-I	4	0	0	4	40	60	100
7	DSC-17	DME558	Production Technology-I Lab	0	0	2	1	50	50	100
8	DSC-18	DME561	Mechanical Maintenance Shop	0	0	2	1	50	50	100
Specialization II			**Automobile Engineering**							
6	DSC-16	DME505	Automobile Engineering	4	0	0	4	40	60	100
7	DSC-17	DME559	Automobile Engineering Lab	0	0	2	1	50	50	100
8	DSC-18	DME561	Mechanical Maintenance Shop	0	0	2	1	50	50	100
Specialization III			**Refrigeration & Air Conditioning Engineering**							
6	DSC-16	DME509	Refrigeration	4	0	0	4	40	60	100
7	DSC-17	DME560	Refrigeration Lab	0	0	2	1	50	50	100
8	DSC-18	DME562	RAC Workshop Lab	0	0	2	1	50	50	100
9	DSEC-I	-	Discipline Specific Elective – I	4	0	0	4	40	60	100
10	GEC-I	-	Generic Elective Course – I	3	0	0	3	40	60	100
11	SEC-8	DME556	Industrial Training (Evaluation)	0	0	0	8	50	50	100
12	SEC-9	DDGP501	Discipline & General Proficiency	0	0	0	0	100	0	100
Total				**23**	**0**	**14**	**38**	**590**	**610**	**1200**

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

Diploma – Semester VI

S. No.		Course Code	Subject	Periods			Credit	Evaluation Scheme		
				L	T	P		Internal	External	Total
1	DSC-19	DME608	Welding Technology	4	0	0	4	40	60	100
2	AECC-5	DIP605	Entrepreneurship	4	0	0	4	40	60	100
3	DSC-20	DME659	Welding Technology Lab	0	0	4	2	50	50	100
Specialization I			**Production Engineering**							
4	DSC-21	DME603	Production Technology – II	4	0	0	4	40	60	100
5	DSC-22	DME609	Production Automation	4	0	0	4	40	60	100
6	DSC-23	DME657	Production Technology - II Lab	0	0	2	1	50	50	100
7	SEC-10	DME662	Major Project	0	0	12	6	50	50	100
Specialization II			**Automobile Engineering**							
4	DSC-21	DME604	Automobile Maintenance Services & Repair	4	0	0	4	40	60	100
5	DSC-22	DME610	Automobile Technology	4	0	0	4	40	60	100
6	DSC-23	DME658	Automobile Maintenance Services & Repair Lab	0	0	2	1	50	50	100
7	SEC-10	DME663	Major Project	0	0	12	6	50	50	100
Specialization III			**Refrigeration & Air Conditioning Engineering**							
4	DSC-21	DME607	Air Conditioning	4	0	0	4	40	60	100
5	DSC-22	DME611	Refrigeration Plant, Erection and Servicing	4	0	0	4	40	60	100
6	DSC-23	DME660	Air Conditioning Lab	0	0	2	1	50	50	100
7	SEC-10	DME661	Major Project	0	0	12	6	50	50	100
8	DSEC-2	-	Discipline Specific Elective – II	4	0	0	4	40	60	100
9	GEC-2	-	Generic Elective Course – II	3	0	0	3	40	60	100
10	SEC-11	DDGP601	Discipline & General Proficiency	0	0	0	0	100	0	100
Total				**23**	**0**	**18**	**32**	**490**	**510**	**1000**

Diploma in Mechanical Engineering (Automobile/Production/Refrigeration & Air-Conditioning) Curriculum

ELECTIVE COURSES OFFERED

Generic Elective Courses (GEC)

(Student can select any one open elective offered by university)

S. No	Code	Course	L	T	P	Credit
		Semester V (Any one)				
1	DGEC501	Non-Conventional Energy Sources	3	0	0	3
2	DGEC502	Power Plant Engineering	3	0	0	3
		Semester VI (Any one)				
1	DGEC601	Non-Conventional Energy Sources	3	0	0	3
2	DGEC602	Power Plant Engineering	3	0	0	3

Discipline Specific Elective Courses (DSEC)

S. No	Code	Course	L	T	P	Credit
		Semester V (Any one)				
1	DME511	CNC Machine Technology	4	0	0	4
2	DME512	Heat and Mass Transfer	4	0	0	4
3	DME513	Total Quality Management	4	0	0	4
		Semester VI (Any one)				
4	DME612	Production Planning and Control	4	0	0	4
5	DME613	Internal Combustion Engine	4	0	0	4
6	DME614	Composite Materials	4	0	0	4

Note :			
L- Lecture	T- Tutorial	P- Practical	C- Credits
1 L = 1 Hour	1T = 1 Hour	1P = 1 Hour	1C = 1 Hour L or T 1C = 2 Hour P