Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in light of NEP-2020
Diploma in Mechanical Engineering
SEMESTER VI (2022-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
DTME601N	DC	COMPUTER INTERGRATED MANUFACTURING	60	20	20	30	20	2	1	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 20 marks.

Course Educational Objectives (CEOs):
The use of conventional machines is decreasing day by day. Evolution of information Technology, variety of manufacturing concepts with zero lead time demand and quality consciousness has supported fast adaption of Computer Aided Manufacturing.

Course Outcomes (COs):
After completion of this course the students will be able to demonstrate following knowledge, skills, and attitudes -

1. Understand the principle of CIM and automation used in various industrial area.
2. Know the constructional features of CNC machines.
3. Construct part programs using ISO format for given simple components.
4. Develop an FMS (Flexible Manufacturing System) layout for given simple part family, using group technology concepts and familiarize with computer aided process planning
5. Recognize use of robotics, in the field of manufacturing.

Syllabus: -

UNIT I
INTRODUCTION TO CIM & AUTOMATION **07Hrs.**
CIM – definition, scope, and elements of CIM system-benefits. Automation -definition- Basic elements of an automated system -Levels of automation.

UNIT II
NC AND CNC MACHINES **08 Hrs.**
Fundamentals of NC Technology- Basic Components of an NC System. Construction and Features of CNC- The Machine Control Unit for CNC- CNC Software, Various elements of CNC machines i.e., Automatic tool changer (ATC)- Automatic pallet changer (APC), feed drives, guide ways, spindle assembly. CNC Applications-Advantages and Disadvantages of CNC.

UNIT III - PART PROGRAMMING **07 Hrs.**
Introduction to Part Programming-Coordinate System-Dimensioning-Axes & motion nomenclature. CNC part programming- Structure of part-program Word addressed format-Preparatory func-

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SEMESTER VI (2022-2025)

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DTME601N	DC	COMPUTER INTERGRATED MANUFACTURING	60	20	20	30	20	2	1	2	4

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tion(G)-Miscellaneous function(M)- Tool compensation- Subroutines (Macros)(L)-Canned cycles-Mirror image, Simple program on Milling and Turning operations

UNIT IV- GROUP TECHNOLOGY **07 Hrs.**

Definition-Group Technology, Part family formation-Classification and coding, Applications & benefits of GT, Cellular Manufacturing-Machining cell designs-Machining cell planning, Computer aided process planning-Approaches to CAPP-Implementation techniques,

UNIT V- ROBOTICS **07 Hrs.**

Introduction-definition of robot-Elements of a robotic system-Classification of robots based on mechanical configuration, Drive systems, Control systems, Performance, capabilities, specification, key feature, Applications of industrial robot.

Reference Books:

1. *Automation, Production Systems, and Computer Aided Manufacturing by Mikell P.Groover,Prentice-Hall International publication.*
2. *Mechatronics by HMT limited, McGraw Hill Education*
3. *CAD/CAM Principles and Applications by P N Rao, McGraw Hill Education.*
4. *CAD/CAM/CIM P. Radhakrishnan, S. Subramanian, V. Raju New Age International Publishers.*
5. *CNC Machines by Pabla B.S., Adithan M. New Age International, New Delhi,2014(reprint)*
6. *Computer Numerical Control-Turning and Machining centers by Quesada Robert Prentice Hall 2014.*
7. *CAD/CAM by Sareen Kuldeep, S.Chand 2012.*
8. *INDUSTRIAL ROBOTICS by Groover, McGraw Hill Education publication,2017.*

List Of Practical:

1. To write a program to obtain the turning cycle in the CNC lathe.
2. To write a program to obtain the facing cycle in the CNC lathe.
3. To write a program to obtain the Circular Interpolation in the CNC lathe.
4. To write a program to perform the mirroring operation.
5. To write a program to engrave the letters "SVVV" on the given work piece.

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DTAU602	DC	AUTOMBILE AIR CON-DITIONING	60	20	20	30	20	2	1	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
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Course Educational Objectives (CEOs):
The aim of this course is to help the student (A) to attend the following industry identified competency through various teaching learning experiences (B) maintain vehicle air conditioning and heating systems.

Course Outcomes (COs):
The theory and practical experiences and relevant soft skills associated with the scores are to be taught and implemented so that the students demonstrate the following industry-oriented CEOs associated with the above-mentioned patency.

Syllabus: -

UNIT-I **8 Hrs.**

Heating, Ventilation and Air-Conditioning System: environmental safety aspects in heating ventilation and air conditioning system human comfort control companies own air movement wind chill factor order problem and effect of humidity modes of heat transfer convection radiation evaporation and conduction requirement of heating ventilation and air conditioning system cycle and basic component

UNIT-II **9 Hrs.**

Case and Duct system: air intake section core section and distribution section downstream of stream displayed in hybrid left system rear heating and cooling system air filter and air blower in AC system AC system operational preference

UNIT-III **8 Hrs.**

Air conditioning system general layout of automotive air conditioning system evaporator condenser accumulator receiver and dryers scroll and Rotary when compressors drive system for compressor refrigerant property types of colour code and purity test metering devices thermostatic expansion valves symptoms false causes and limitations in compressor

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DTAU602	DC	AUTOMBILE AIR CON-DITIONING	60	20	20	30	20	2	1	2	4

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UNIT-IV **8 Hrs.**

AC system and control system control system and electronic temperature control resulting vacuum switches pressure regulators science online Sir flat in self and car temperature sensor basic control devices aspirator blower clutch control heater control climate control system and electronic climate control system

UNIT-V **8 Hrs.**

Inspection of the system visual side glass leak test and temperature test direction charging of pre-vent moisture remove equipment and tools houses and connectors

Textbooks:

1. Automobile air conditioning; Dwiggins, Boyce H. Delmar Cengage learning;8th resised edition,1995.
2. Automotive heating and air conditioning manual; Haynes John Stubblefield Mike; Haynes manuals N. America, Incorporated 2011

List of Experiments:-

1. Prepare a chart showing the layout and construction details of all the components of automobile air conditioning systems.
2. Prepare cut section models of basic compressor
3. Perform a market survey for different types of refrigerants available in the market.
4. Prepare chart on aggregate of control climate control system of car air conditioning system.

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DTAU603A	DC	Automotive Engine Diagnostics and Testing	60	20	20	0	0	2	1	0	3

Legends: L - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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Course Educational Objectives (CEOs):
Student can be able to remedy engine troubles based on diagnosis and testing using suitable instruments and tools.

Course Outcomes (COs):
Students will:

1. Identify and diagnose the causes of malfunctioning of an engine.
2. Rectify engine troubles based on symptoms and causes.
3. Use the suitable instrument and tools for diagnosis and testing of automotive engine systems. Remove engine from automobile, disassemble and rectify faults.

Syllabus: -

UNIT I **8 Hrs.**

Tools and Techniques for maintaining Automobile Engine System: Engine Maintenance Tools and instruments. - General and Special Tools - Measuring Tools and Instruments, Engine removal preparation and procedure, Upper engine Disassembly and cleaning, Lower engine Disassembly and cleaning.

UNIT II **8 Hrs.**

Inspection, Testing and Reconditioning of Engine Components: Different Engine tests like, compression test, vacuum test, cylinder leakage test etc., Inspection of different engine components., Types of defects (troubles), likely to occur in different engine components and their analysis., Causes and remedies for different troubles in engine components., Reconditioning methods (Grinding, Boring, Honing and Lapping) of different engine components., Replacement procedure of different engine components.

UNIT III **8 Hrs.**

Inspection, Service and Repair of Fuel System Components for Petrol & Diesel Engines: Inspection, repair and service of fuel tank, fuel lines and fuel filters, Inspection, repair, testing and

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DTAU603A	DC	Automotive Engine Diagnostics and Testing	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
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service of fuel pump, Carburetor cleaning, servicing and adjustment, Servicing of Air cleaners, Inspection, repair, and service of petrol injection system (MPFI).
Inspection, repair, and service of LPG/CNG system, Testing and adjustment of fuel injectors and nozzles, Calibration and phasing of fuel injection pump, Servicing of the fuel feed pump, Procedure of checking and setting of governors, Checking, and setting of injection timing, Replacement of the fuel filters, Bleeding of the diesel fuel feed system.

UNIT IV **8 Hrs.**

Servicing, Maintenance and Overhauling of Cooling & Lubricating System: Causes of engine overheating, Servicing of the radiator and water jacket, Detection, and repairs of leakage in the radiator and cooling system, Repairs, maintenance and overhauling of water pump, Testing of thermostat valve.
Defects in the cooling system components, their causes, and remedies, Checking and testing of the lubricating system, Servicing of oil pump and relief valve, Deterioration of Engine oil, Excessive oil consumption, Low and high oil pressure, Necessity of oil & filter change, Servicing, and replacement of the oil.

UNIT V **8 Hrs.**

Engine Performance: Types of dynamometers, working principle, merits and limitations, Engine power measurements and related terms, Determination of I.H.P., B.H.P., F.H.P. and torque, Computation of various efficiencies, mean effective pressure, specific fuel consumption, Plotting of the graphs and interpretation of the data from the graph, Morse Test on I.C. Engine.

Textbooks:

1. R. B. Gupta, Automobile Engineering, Satya Prakashan, New Delhi.
2. W.H.Crouse & D.L. Anglin, Automotive Mechanics, Tata Mc-Graw Hill Publishing Co. Ltd.-New Delhi.
3. N.K.Giri, Automotive Technology, Khanna Publication Co. (P) Ltd.

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DTAU603A	**DC**	**Automotive Engine Diagnostics and Testing**	60	20	20	0	0	2	1	0	**3**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

4. R.C. Mishra, K. Pathak, Maintenance Engineering and Management, PHI Learning Pvt. Ltd., 2004.

References:

1. Ernest A. Venk, Edward Dale Spicer & Irving Augustus Frazee, Automotive maintenance and trouble shooting.
2. James Larminie, Automotive Engines Theory & Servicing, 5th Edision, Pearson Education India.
3. Jain and Astana, Automobile Engineering, Tata Mc-Graw Hill Publishing Co. Ltd.-New Delhi.

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DTAU603B	DC	Hydraulic and Pneumatic Control	60	20	20	0	0	2	1	0	3

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Course Educational Objectives (CEOs):
The subject aims to provide the student with:
1. An understanding of basic of fluids and hydraulic systems.
2. To understanding the working and characteristics of pumps and controllers

Course Outcomes (COs):
Students will:
1. Be able to understand the fundamentals of Hydraulics.
2. Be able to understand principle of fluid power and hydraulic pumps.
3. Be able to understand fundamentals of control systems.
4. Be able to understand hydraulic circuits and systems.
5. Be able to understand Pneumatic and Electro Pneumatic Systems.

Syllabus: -

UNIT I **8 Hrs.**

Introduction of Fluids: Classification of Fluids, Properties of Fluids, Pascal's Law, Specifications of Hydraulics fluids, Types of Fluid Flow: Steady, unsteady, laminar and turbulence. Hydraulic Measuring devices.

UNIT II **9 Hrs.**

Fluid Power Principles: Introduction to Fluid power, Advantages and Applications, Fluid power systems, Types of fluids, Properties of fluids and selection, Basics of Hydraulics: Pascal's Law.
Hydraulic Pumps: Pump Classification, Construction, Working, Design, Advantages, Disadvantages, Performance, Selection criteria of Linear and Rotary, Fixed and Variable displacement pumps.

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DTAU603B	DC	Hydraulic and Pneumatic Control	60	20	20	0	0	2	1	0	3

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UNIT III **8 Hrs.**

Hydraulic Actuators and Control Components: Hydraulic Actuators: Types and construction, Application, Hydraulic motors,

Control Components: Types of direction control, Flow control and pressure control valves, Servo and Proportional valves and applications.

UNIT IV **8 Hrs.**

Hydraulic Circuits and Systems: Accumulators, Intensifiers, Industrial Hydraulic Circuits, Pump Unloading, Double Pump, Pressure Intensifier, Sequence, Reciprocation, Synchronization, Fail-Safe, Speed Control, Hydrostatic Transmission, Electrohydraulic Circuits, Mechanical Hydraulic Servo Systems.

UNIT V **8 Hrs.**

Pneumatic and Electro Pneumatic Systems: Properties of air, Perfect Gas Laws, Compressor: Filters, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust Valves, Pneumatic actuators, Design of Pneumatic circuit: Cascade method, Electro Pneumatic System, Elements, Introduction to fluidics and pneumatic logic circuits.

Textbooks:

1. Hydraulic and Pneumatic Control, by S.K. Sundaram, S. Chand, 2nd edition 2006.
2. Fluid Mechanics and Fluid Power Engineering, by D.S. Kumar, S.K. Kataria & Sons, 9th edition, 2015.
3. Fluid Mechanics and Hydraulic Machines, by R.K. Bansal, Laxmi Publication, 9th edition, 2015.
4. Fluid Mechanics and Hydraulic Machines, by R.K.Rajput, S. Chand & Co. 8th edition, 2011.
5. Fundamentals of Fluid Mechanics, by Munson, Wiley India Pvt. Ltd. 6th edition, 2010

References:

1. Fluid Mechanics and Turbo Machines by Das, Madan Mohan, PHI Learning, 2nd edition 2008
2. Hydraulic and Fluid Mechanics, by P.N. Modi, S.M. Sethi, Standard Book House, 6th edition, 2010

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DTAU603B	DC	Hydraulic and Pneumatic Control	60	20	20	0	0	2	1	0	3

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3. Fluid Power Engineering by R.N. Patel and V.L. Patel Mahajan Publication, 9th edition, 2015.
4. Introduction to Hydraulic and Pneumatics, by S. Ilango and V. Soundararajan, PHI Learning Pvt. Ltd. 3rd edition, 2011.

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DTAU603C	DC	AUTOMOTIVE ELEC-TRICAL AND ELEC-TRONICS SYSTEMS	60	20	20	0	0	2	1	0	3

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Course Educational Objectives (CEOs):
This course provides a fundamental understanding of (A) Batteries and Accessories, System Engineering(B)Charging System and Fundamentals of Automotive Electronics (C)Sensors and Activators.

Course Outcomes (COs):
After learning the course, the students should be able to:

1. Understand and use a voltage/amperes tester to test and diagnose problems in the automobile battery, starting, and charging systems
2. Understand the application of Sensors and Activators used in automobile system.

Syllabus: -

UNIT I

Batteries and Accessories: Principle and construction of lead acid battery; characteristics of battery, rating capacity and efficiency of batteries, various tests on batteries; maintenance and charging.
Lighting system: insulated and earth return system, details of head light and side light, LED lighting system, head light dazzling and preventive methods Horn, wiper system and trafficator.

UNIT II

System Engineering: Condition at starting, behavior of starter during starting, series motor and its characteristics; principle and construction of starter motor, working of different starter drive units, care and maintenances of starter motor, starter switches.

UNIT III

Charging System: Generation of direct current, shunt generator characteristics, armature reaction, third brush regulation, cutout. Voltage and current regulators, compensated voltage regulator, alternators principle and constructional aspects and bridge rectifiers, new developments.

UNIT IV

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DTAU603C	DC	AUTOMOTIVE ELECTRICAL AND ELECTRONICS SYSTEMS	60	20	20	0	0	2	1	0	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** – Credit.
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Fundamentals of Automotive Electronics: Current trends in automotive electronic engine management system; electro-magnetic interference suppression, electromagnetic compatibility, electronic dashboard instruments, onboard diagnostic system, security and warning system

UNIT V

Sensors and Activators: Types of sensors: sensor for speed, throttle position, exhaust oxygen level, manifold pressure, crankshaft position, coolant temperature, exhaust temperature, air mass flow for engine application. Solenoids, stepper motors, relay.

Reference Books:

1. *"Understanding Automotive Electronics" by Bechhold Publisher SAE, 1998.*
2. *"Automobile Electrical Equipment" by Crouse W.H, Publisher: McGraw-Hill Book Co., Inc., New York, 3rd edition, 1986.*
3. *"Modern Electrical Equipment of Automobiles" by Judge A.W ", Publisher: Chapman & Hall, London, 1992.*
4. *"Automotive Electrical Equipment" by Kholi.P.L Publisher: Tata McGraw-Hill Co., Ltd., New Delhi, 1975.*
5. *"Automotive Handbook" by Robert Bosch Publisher: SAE (5th Edition), 2000.*
6. *"Internal Combustion Engines" by Ganesan.V. Publisher: Tata McGraw-Hill Publishing Co., New Delhi, 2003.*

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Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
Diploma in Automobile Engineering (2021-2024)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERMS EXAM	TEACHER ASSESSTMENT *	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT *				
DTAU604	PW	MAJOR PROJECT	0	0	0	100	50	0	0	10	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; C - Credit.
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 20 marks.

Course Educational Objectives (CEOs):
(A) To develop the ability to solve a specific problem right from its identification and literature review till the successful solution of the same (B) To train the students in preparing project reports and to face reviews and viva voce examination.

Course Outcomes (COs):
After completion of this course, the students will be able to
1. Identify real world problems of mechanical engineering and related systems.
2. Interpret the working of mechanical engineering systems.
3. Apply the principles of mechanical engineering in real world systems.
4. Criticize and experiment to arrive at solutions for real world mechanical engineering problems.
5. Analyze and evaluate to obtain solution for problems in mechanical engineering systems.
6. Develop a prototypes/models, experimental set-up, and software systems necessary to meet the objectives.
7. Identify methods and materials to conduct experiments/develop code.
8. Reorganize the procedures with a concern for society, environment, and ethics.
9. Analyze and discuss the results to draw valid conclusions.
10. Prepare a report as per recommended format and defend the work.

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Syllabus: -

1. Major Project:

Each project will cover all the aspects (to the extent possible) of real-life application of concepts studied under the program; Alternately, a few research problems also may be identified for investigation; The project shall be driven by realistic constraints like that related to economic, environmental, social, political, ethical, health & safety, manufacturability, and sustainability.

2. Internship:

Alternately,student is encouraged to take an industrial project with reputed organizations or firms chosen by the institute. In such cases the student will stay with the firm and carry out the project. The project will be guided by the faculty member and the concerned officer in the industry. All the requirements spelt out under 'MAJOR PROJECT' above, shall be incorporated under this work also. However, reviews will be conducted in the institute which the student shall attend.

2.1 Course Description:

An internship experience provides the student with an opportunity to explore career interests while applying knowledge and skills learned in the classroom in a work setting. The experience also helps students gain a clearer sense of what they still need to learn and provides an opportunity to build professional networks.

2.2 Learning Goals:

The internship will provide students with the opportunity to:

1. Gain practical experience within the business environment.
2. Acquire knowledge of the industry in which the internship is done.
3. Apply knowledge and skills learned in the classroom in a work setting.
4. Develop a greater understanding about career options while more clearly defining personal career goals.
5. Experience the activities and functions of business professionals.
6. Develop and refine oral and written communication skills.
7. Identify areas for future knowledge and skill development.

3. General Rules of Selection/Allotment of Dissertation Title and Its Submission:

3.1) The selection of dissertation title should be non-trivial, analytical, practical/hardware implementation based, application oriented (relevant to the need of industries) and should involve the elementary research and/or development effort based on a specific theme.

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3.2) Students may be encouraged to undertake industry defined dissertation. For the industry defined dissertation there shall be one external supervisor of the industry and one internal supervisor of student's own department. It will be the sole responsibility of internal supervisor to define the research problem, scope, methodology and outcome from the dissertation in consultation with external supervisor.

3.3) Supervisors for the dissertation can suggest the titles of dissertation considering their long-term goal for research.

3.4) Students can also discuss the titles of their choice or titles given from industries with the supervisors and if feasible and accepted by supervisors, can be included in the list of suggested titles.

3.5) Consolidated list of suggested dissertation titles will be communicated to the students in semester VI

3.6) In case, if two students give choice for same title; title will be allotted based on merit.

3.7) Final allotment of titles and supervisors will be published on notice board in consultation with Head of the Department.

3.8) Requirement of change in the title of dissertation work should be applied to the Head of the Department with sufficient reasons for the change, before the exam of Dissertation Progress Review-I.

3.9) After Dissertation Progress Review-I exam, change of the title will be permitted based on the comments of internal examiner. Such cases should apply for the change in titles and should get approval from the Head of the Department.

4. Dissertation Work in Collaboration with Industry:

4.1) It is preferable that students, with the approval of the Head of the Department, visit industry or a Research Laboratory for data collection, discussion of the dissertation, experimental work, survey, field studies, etc. during the project period. Projects sponsored by the Industries or R&D organizations will be encouraged and a close liaison with such organizations will be maintained.

4.2) Students shall acknowledge the involvement and / or contribution of an Industries or R&D organizations for their dissertations.

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4.3) Satisfactory completion certificate issued by the Industry or R&D organization should be attached with the dissertation report.

4.4) Internal supervisor, should monitor the progress of his/her students by remaining in contact with the students and external supervisors by emails, video conferencing and/or by making visits to the industries at least once in a month, depending on the need of project and as decided by concerned Head of the Department.

5. Supervisors:

5.1) Students shall be assigned one or two supervisors(s) from the Institute.

5.2) In case any supervisor leaves the Institute permanently or temporarily for a period exceeding one semester, the Head of the Department shall appoint new supervisor for the concern students. Any such arrangements made, should get approval from Head of the Institute.

5.3) A faculty can supervise maximum 6 (Six) Dissertations at a time.

5.4) In case of interdisciplinary areas, at least one supervisor must belong to the discipline in which the student is registered.

6. Dissertation Evaluations:

6.1) For continuous evaluation (*CE), a comprehensive internal assessment of the dissertation work should be made by an internal review panel formed by Head of the Department, supervisor and at least two senior faculty with expertise in same field of dissertation work.

6.2) Internal review panel will review the progress of the students in the last week of 1st, 2nd, 3rd and 4th month of semester VI (i.e. four presentation in front of internal review panel) and finally give his/her assessment of the work done by the students for internal continuous evaluation marks with comments of the review.

6.3) Dissertation and External Viva-Voce:

1. If any student has not done satisfactory work, then internal review panel may not allow the student for external practical exam.

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2. Review record for all the previous reviews along with remedial review (if applicable) should be maintained by the supervisor and marks will be allotted based on the review.
3. Students must submit a dissertation report on the project work conducted by him/her. The guidelines for preparation of dissertation report shall be followed by every student as per guidelines given by the department
4. The final dissertation report shall be submitted on or before the submission date mentioned in academic calendar.
5. For DISSERTATION, three hard bound copies (for supervisor, department library and student copy) along with a soft copy (in CD containing pdf of the report, certificate of paper published (if any) and detailed paper, with name, enrollment number, branch, year of admission of the student written on the CD) of the dissertation report shall be submitted to the Head of the Department before final examination of DISSERTATION on or before the date notified by the University. Reports must be certified by the supervisor, Head of the Department, and the Head of the Institution.
6. Dissertation viva - voce will be held within the date fixed in the academic calendar and the grades will be finalized. External examiner will evaluate dissertation work in semester VI. For DISSERTATION External examiner shall be from outside the Institution. The external expert who examines the dissertation will conduct the viva voce.
7. Details of all internal review (Internal continuous evaluation) and external exams (External Practical) shall be adequately notified to enable interested faculty members and students to attend the same.

6.4) Work to be completed by the students till the internal review and external viva (External Pr) exam should be as follows:

Sem	Subject and Sub. Code	Details	Work to be complete
		DISSERTATION PROGRESS REVIEW I for continuous evaluation (To be taken at the end of 1st month of sem VI)	Students should demonstrate in-depth knowledge and thoughtful application in stating an in-depth analysis of key theories supporting the study, problem definition must be complete. In this Presentation students must teach the theory related to dissertation title with

Sem VI	**DISSERTATION PROGRESS REVIEW**		10% of work completion.
		DISSERTATION PROGRESS REVIEW II for continuous evaluation (To be taken at the end of 2nd month of sem VI)	Literature review and problem definition with objectives should be complete. Presentation of literature review should be in terms of table comparing different points. 20% of work should be complete
		DISSERTATION PROGRESS REVIEW III for continuous evaluation (To be taken at the end of 3rd month of Sem VI)	Demonstrate understanding, Application of relevant methodology, techniques, and analysis with 40% of work completion.
		DISSERTATION PROGRESS REVIEW IV for continuous evaluation (To be taken at the 4thMonth of Sem VI)	60% of work should be complete, future action plan/methodology and outcomes must be clear. (If dissertation is based on simulation/analysis and hardware then 100% simulation/analysis work should be complete)
	FINAL DISSERTATION	**FINAL DISSERTATION** (External-Pr) (To be taken at the end of sem VI)	100% of work should be complete, reporting the study's main results/findings with clear interpretation and discussion of the results.

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