

GANPAT UNIVERSITY									
FACULTY OF GANPAT UNIVERSITY INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME501		Subject Name		Computer Aided Design				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	2	0	4	Theory	40	60	100
Hours	2	2	4	0	6	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Select configuration of CAD workstation. ▪ Select type of modeling technique for given part. ▪ Design, develop and model the given part using various CAD software like-Creo/Catia/Unigraphics/Solid edge/Inventor/ AutoCAD, etc. ▪ Prepare solid models & assembly of mechanical parts. 									
Theory syllabus									
Unit	Content								Hrs
1	Fundamentals of CAD Computer graphics & its terminology.CAD definition, concept & need.CAD process.Functional areas of CAD. Coordinate systems.Geometric transformation-concept and types.Two dimensional (2D) geometrictransformation- translation, scaling,rotation and mirror with numeric examples.								4
2	CAD Hardware CAD Workstation-types, functions and configuration. Input and output devices (including voice, gesture, 3 dimensional (3D) printer, etc)-types, configuration and applications.								2
3	Geometric modeling Difference between 2D & 3D models. Geometric modeling – concept, types, features and applications. Solid modeling methods like Constructive Solid Geometry, Pure primitives & Boundary Representation. Feature base modeling-concept, illustrative examples. Parametric & non parametric modeling-concept, differences and illustration.								4
4	Modeling using AutoCAD Introduction to AutoCAD-3D features and 2D commands overview. 3D primitives-types and defining parameters. User coordinate system (UCS) and its options. 3D draw commands. 3D modify and editing commands. 3D viewing & views generation. Surface modeling commands.								8
5	Parametric Modeling Introduction to parametric modeling software. (Any one from Creo, Unigraphics, CATIA, Solid Edge, Inventor etc). Sketching interfacing overview. 3D working plane introductions. 3D modeling. Assembly modeling. Views generation.								10
Practical content									
Practical, assignments and tutorials are based on above syllabus.									
Text Books									

1	Computer Aided Design by AtulMakvana, AtulPrakasan.
Reference Books	
1	Designing with Creo Parametric 2.0 by Dr. Michel J Rider, SDC Publications.
2	Pro/Engineer wildfire 5.0 instructor by David S. Kelley
3	Mastering in Auto cad by George Ommura
4	CAD/CAM & Automation by Farzak haidaree
5	CAD/CAM/CIM by P.Radhakrishnan&S.Subramanayan

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME502		Subject Name		Design of Machine Elements				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Identify various failures and calculate resisting areas of machine elements. ▪ Design machine element subjected to direct stresses, bending stresses, twisting stresses, combined stress. ▪ Design of thin and thick cylinder pressure vessel. ▪ Select appropriate bearing for given situation/application. 									
Theory syllabus									
Unit	Content								Hrs
1	Introduction General consideration and factors influencing the design of machine elements and design process. Various materials used in manufacturing of machine elements and their properties. Types of loads, types of stresses, concept of stress concentration and factor of safety. Standardization and preferred numbers, numeric examples on preferred numbers								8
2	Design of machine elements subjected to direct stresses Illustration of simple machine elements subjected to direct stresses-independently and identification of resisting areas (simple numeric examples). Design of simple machine elements subjected to uni-axial direct stresses-independently. Design procedure (with numeric examples), steps, identification of resisting areas and design of: Knuckle joint, Cotter joint, Riveted joints, Welded joint-fillet & lap joint, Threaded fasteners & screw jack.								9
3	Design of machine elements subjected to bending stresses Principle of bending and its fundamental equation. Modulus of various sections, example of pure bending like levers, beams, axle, etc. Types of levers. Design procedure (with numeric example) of levers including cross section of arms, bosses and pins. Design procedure (with numeric example) of leaf spring.								5
4	Design of machine elements subjected to direct and twisting moments Fundamental equation of twisting moment with design procedure. Types of shafts with important features of each. Design of shafts (with numeric examples). Types of keys, applications of each and design procedure (with numeric examples). Types of couplings and applications. Design of muff and flange couplings (with numeric examples). Types of spring, terminology related to helical spring and applications of helical spring.								8

5	Design of machine elements subjected to direct and bending stresses Eccentric loading- Concept, Illustrations like frame, C-clamp, Bracket, Foundation bolt, Bolts in flange, etc. Design of machine element like C-Clamp, bracket, foundation bolt and bolts in flange. (With numeric examples).	4
6	Design of pressure vessels Types and applications of pressure vessels used in industries. State Range of pressure also. Design of thick and thin cylinders (with numeric examples). Design of thin spherical shell (with numeric examples).	4
7	Selection procedure for bearings Classification of bearings. Bearing designation as per IS. Antifriction bearings: types, advantages, applications. Selection procedure of anti-friction bearings. Calculation for anti-friction bearings: basic dynamic load, load rating, equivalent load, bearing life.	4
Practical content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	Design of Machine Elements by S.B. Soni, AtulPrakasan.	
Reference Books		
1	A Text book of Machine Design by R.S.Khurmi and J.K.Gupta	
2	Machine Design by R.K.Jain	
3	Design of Machine Elements by Shigley	
4	Design Data Book by K.Mahadevan&Balveera Reddy	
5	Design of machine elements by V.B.Bhandari	

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME503		Subject Name		Estimating, Costing & Engineering Contracting				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Calculate material cost of given component/product. ▪ Identify and estimate elements of cost in various processes. ▪ Perform break even analysis to calculate break even quantity. ▪ Investigate the problem of cost and suggest their solution using cost reduction techniques. ▪ Interpret given model of balance sheet and profit loss account. ▪ Prepare simple engineering contracts. 									
Theory syllabus									
Unit	Content								Hrs
1	Introduction Need, Scope & importance of ECC in industries. Terminology associated with various cost elements and their classification. Terminology associated with overheads, their classification and allocation. Determination of selling price and catalogue price. Depreciation and obsolescence. Concept of Machine Hour Rate (MHR) and process hour rate (PHR). Method to calculate MHR for any machine/machine tool. Method and example to calculate MHR of Lathe, Milling, Drilling, Grinding and Press tool. Method to calculate PHR for any process. Method and example to calculate PHR of running diesel generating set, running air conditioner, running refrigerator, welding and gas cutting.								3
2	Break even analysis Classification of costs as fixed and variable costs. Relationship between the costs and quantity of production. Break Even Chart.								3
3	Cost estimation of welding Elements of cost in arc welding. Factors effecting arc welding cost. Estimating cost elements for Consumables in arc welding and gas cutting, Gas cutting and Arc welding. Estimation of production cost of given welding job for above methods.								3
4	Cost estimation of forging and casting Cost terminology associated with forging shop. The procedure of calculating material cost of a product for forging shop. Procedure of estimating cost of forging dies. Cost terminology associated with foundry shop. The procedure of calculating material cost of a product for foundry shop. Procedure of estimating cost of pattern making, foundry cost.								6

5	Cost estimation of machined part The terminology associated with machine shop estimation. Procedure to estimate material cost. Procedure of estimating cost of machined part for Lathe operations, Drilling operations, Shaping operations, Milling operations, Cylindrical grinding operations. For given machined part, estimate material cost and machining cost.	5
6	Estimation of process cost Understand importance of estimating various process costs. Procedure and steps to estimate cost for Producing power using diesel generating set (cost per hour and cost per unit), Power produced at thermal power plants. (Cost per unit). Pouch packaging. (Cost per pouch). Heat exchanger, cooling or heating. (Cost per hour). Ice plant. (Cost per unit weight). Given the required set of input, estimate the cost of processes specified above.	4
7	Budgeting and contracting Define budget and budgetary control. Purpose, types and benefits of budget. With given example, interpret industrial budget. Prepare simple budget given required input data. Explain various accounting terminology like book value, Net Present Value, Work in progress, Gross Domestic Product (GDP), balance sheet terminology, etc. Define contracts, its characteristics and advantages. Types of contract. Tendering, manual tendering and E-tendering. Provision of different conditions in a contract. Documents required in an engineering contract. Prepare a contract for a given input situation.	4
Practical content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	Estimating, Costing and Engineering Contracting by S.V. Gosai, AtulPrakasan.	
Reference Books		
1	Mechanical Estimating and Costing by Banga and Sharma	
2	Mechanical Estimating and Costing by Shrimali and Jain	
3	Mechanical Costing and Estimation by Singh and Khan	

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME504		Subject Name		Machine Tool Technology				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Working of grinding, super finishing, gear cutting, broaching, threading, non-conventional and advance machining methods. ▪ Interpret designation system / method of cutting tools and tool holders used on machine tools. ▪ Set the machine and mount the job, cutting tools and tool holders correctly. ▪ Select appropriate cutting tools, work holding devices and cutting parameters for the given work piece. 									
Outline the process and produce the job/product as per given drawing/ specification.									
Theory syllabus									
Unit	Content								Hrs
1	Introduction to Machine Tools Technology Need, Scope & importance of Machine tools technology in industries.List of major industries having machine tools in GUJARAT.Need of attitude, knowledge & skill required for shop floor supervisor in Machine tools based industries. Recall fundamentals: definitions of machine tool, cutting speed, feed, depth of cut, metal removal rate, surface finish symbols and values, cutting tools and their geometry.								3
2	Grinding and Super finishing Processes Cutting action of Grinding Wheel. Grinding Wheels types, materials, nomenclature, selection criteria and applications. Terms associated with Grinding wheel operations. Grinding and super finishing operations and machines: Surface (rotary and sliding) grinding machines, Cylindrical (centre less, internal, external) grinding machines. Bench and portable grinder, Tool and cutter grinding machine, Profile grinding. Honing, Lapping and Super finishing. Static and dynamic balancing of grinding wheels-need and Methods. Methods of mounting work piece on cylindrical grinding Machines (Including chuck and mandrel).								9
3	Gear Manufacturing and Gear Finishing Processes Nomenclature of spur and helical gear, types of gears.Generating and forming processes. Gear forming methods –Machine tools specification, working principles, process, cutting tools used with nomenclatures and cutting angles, cutting parameters. Gear generating methods –Machine tools specification, working principles, process, cutting tools used with nomenclatures and cutting angles, cutting parameters. Gear finishing methods-methods and working principles.								8

4	Thread Production Methods Thread nomenclature and important terminologies used in thread production. Various methods of thread productions, constructional features of thread production machines/processes, their working principles, cutting tools and cutting parameters, applications, advantages and limitations.	5
5	Broaching, Jig Boring and Special Purpose Machine Tools Need, types, constructional features and applications of broaching machines. Shapes which can be broached. Special features and comparison. Need, constructional features, working principle and applications of jig boring machines. Various SPM and their area of application. Parts fit for SPM. Comparison of SPM with other automates.	8
6	Nonconventional and advance Methods of Machining Need, constructional features, working principles ,tools, working parameters and applications:(ECM, EDM, USM, ECG, AJM, Plasma beam, laser, plasma arc machining, Electro beam machining, chemical machining).Micro electro-mechanical systems (MEMS)	9
Practical content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	Machine Tool Technology by C.M. Desai, AtulPrakasan.	
Reference Books		
1	Machine tools technology by G. S. Kandaswami	
2	Metal cutting technology & Experiments by K. G. Chaniramani	
3	Principles of Engineering Production by A.Lissamay&S.Martin	
4	Production Engineering Sciences by Dr. P. C. Pande& C. K. Singh	
5	M.E.M.S. and Microsystems: Design and Manufacturing by Tai-Ran Hsu	

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME505		Subject Name		Plant Maintenance & Safety				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Recognize troubles in mechanical elements. ▪ Assemble, dismantle and align mechanisms in sequential order. ▪ Carry out plant maintenance using tri-bology, corrosion and preventive maintenance. 									
Theory syllabus									
Unit	Content								Hrs
1	Fundamentals of maintenance engineering Aim of maintenance engineering. Primary and secondary functions and responsibility of maintenance department. Types of maintenance. Types and applications of tools used for maintenance. Maintenance cost & its relation with replacement economy. Service life of equipment.								4
2	Wear and Corrosion and their prevention Wear- types, causes, effects. Wear reduction methods. Lubricants-types and applications. Lubrication methods –General sketch, working and applications. Definition, principle and factors affecting the corrosion. Types of corrosion. Corrosion prevention methods.								8
3	Fault tracing Fault tracing-concept and importance. Decision tree-concept, need and applications. Sequence of fault finding activities, show as decision tree. Draw decision tree for problems in machine tools, hydraulic, pneumatic, automotive, thermal and electrical equipments like any one machine tool, pump, air compressor, IC engine, boiler, and electrical motors. Types of faults in machine tools and their general causes.								6
4	Periodic and preventive maintenance Periodic inspection-concept and need. Degreasing, cleaning and repairing schemes. Overhauling of mechanical components. Overhauling of electrical motor. Common troubles and remedies of electric motor. Repair complexities and its use. Definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of machine tools, pumps, air compressors, diesel generating sets. Program and schedule of preventive maintenance of mechanical and electrical equipments. Repair cycle-concept and importance.								10
5	Industrial safety Accident - causes, types, results and control. Mechanical and electrical hazards-types, causes and preventive steps/procedure. Describe salient points of Factories act 1948.for health and								5

	safety-, wash rooms, drinking water layouts, light, cleanliness, fire, guarding, pressure vessels, etc. Safety colour codes. Fire prevention and fire fighting, equipment and methods.	
6	Recovery, reconditioning and retrofitting Definition of recovery, reconditioning and retrofitting. Methods of recovery and their applications. Selection criteria of recovery methods. Reconditioning process, features and advantages. Retrofitting concept, need and applications.	5
7	Installation, erection and commissioning of equipments Design and planning of foundation. Erection and commissioning of equipment. Alignment and testing of equipment.	4
Practical content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	Plant Maintenance and Safety by K.K. Patel, AtulPrakasan.	
Reference Books		
1	Maintenance Engineering Handbook by Higgins & Merrow	
2	Maintenance Engineering by H.P.Garg	
3	Foundation Engineering Handbook by Winterkorn	
4	Pump-Hydraulic Compressors by Audels	

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme	Diploma Engineering				Branch/Spec.	Mechanical Engineering			
Semester	V				Version	1.0.0.0			
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code	1ME506		Subject Name		Industrial Management				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	0	0	3	Theory	40	60	100
Hours	3	0	0	0	3	Practical	0	0	0
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Interpret given organization structure, culture, climate and major provisions of factory acts and laws. ▪ Material requirement planning and store keeping procedure. ▪ Plot and analyze inventory control models and techniques. ▪ Prepare and analyze CPM and PERT for given activities. ▪ PPC functions. 									
Theory syllabus									
Unit	Content								Hrs
1	Introduction System- concept, definition, types, parameters, variables and behaviour. Management definition and functions. Organization structure definition, goals, factors considered in formulating structure, types, advantages and disadvantages, applications. Concept, meaning and importance of division of labor, scalar & functional processes, span of control, delegation of authority, centralization and decentralization in industrial management. Organizational culture and climate –meaning, differences and factors affecting them. Moral-factors affecting moral. Relationship between moral and productivity. Job satisfaction- factors influencing job satisfaction. Important provisions of factory act and labor laws.								6
2	Network analysis CPM & PERT-meaning, features, difference, applications. Understand different terms used in network diagram. Draw network diagram for a real life project containing 10-15 activities, computation of LPO and EPO. Determination of critical path on network. Floats, its types and determination of floats. Crashing of network, updating and its applications.								10
3	Materials Management Material management-definition, functions, importance, relationship with other departments. Purchase - objectives, purchasing systems, purchase procedure, terms and forms used in purchase department. Storekeeping- functions, classification of stores as centralized and decentralized with their advantages, disadvantages and application in actual practice. Functions of store, types of records maintained by store, various types and applications of storage equipment, need and general methods for codification of stores. Inventory control, Material Requirement Planning (MRP)-concept, applications and brief details about software packages available in market.								8

4	Production planning and Control (PPC) Types and examples of production. PPC: Need and importance, Functions, Forms used and their importance, General approach for each type of production. Scheduling- meaning and need for productivity and utilisation. Gantt chart- Format and method to prepare. Critical ratio scheduling-method and numeric examples. Scheduling using Gantt Chart. Bottlenecking.	10
5	Value Analysis (VA) and Cost Control VA-definition, terms used, process and importance. VA flow diagram. DARSIRI method of VA. Case study of VA-at least two. Waste-types, sources and ways to reduce them. Cost control-methods and important guide lines.	4
6	Recent Trends in IM ERP (Enterprise resource planning) - concept, features and applications. Important features of MS Project. Logistics- concept, need and benefits. Just in Time (JIT)-concept and benefits. Supply chain management-concept and benefits.	4
Practical content		
Practical, assignments and tutorials are based on above syllabus.		
Text Books		
1	Industrial Engineering & Management by O. P. Khanna, Dhanpatrai Publications.	
Reference Books		
1	CPM & PERT principles and Applications by L.S.Srinath.	
2	Modern Production Management by Buffa.	
3	Materials Management by N. Nair.	
4	Value Analysis by Mikes	

GANPAT UNIVERSITY									
FACULTY OF INSTITUTE OF TECHNOLOGY									
Programme		Diploma Engineering			Branch/Spec.		Mechanical Engineering		
Semester		V			Version		1.0.0.0		
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2014	
Subject code		1ME507		Subject Name		Minor Project			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	0	0	1	0	1	Theory	0	0	0
Hours	0	0	2	0	2	Practical	50	50	100
Pre-requisites:									
None									
Learning Outcome:									
After successful completion of the course, student will be able to									
<ul style="list-style-type: none"> ▪ Plan and identify materials, processes and other resources optimally. ▪ Develop innovative and creative ideas. ▪ Develop interpersonal skill and team work. ▪ Develop sense of environmental responsibility. ▪ Familiar with fast changes in technology. 									
Practical content									
Sr. No.	Topics								Hrs
1	Feasibility Report (Practice for preparing feasibility report based on data/assumption) Prepare a feasibility report to start a small scale Industry for a simple product. The report should be in line with the requirements of proposal from District Industries centre/GSFC/ GIIC etc.								04
2	Industry based Investigation The report includes the Investigations carried out in the suggested areas at industry place, such as (any one) : a) Tool life/ critical speed investigations. b) Heat loses in I.C. Engines using different laggings. c) Fault finding in Machine Tools, Equipments, etc. d) CNC maintenance e) Incentive system and job satisfaction f) Performance based investigation to define relations of various parameters affecting efficiency in Pump, air compressor, turbine, LPG run engine, CNG run engine, Hydraulic JCB, etc.(Any one such equipment or device)								06
3	Industry based Live Case Studies a) Case study report done in areas like(any one) b) Advance manufacturing processes. c) Process planning of complex job in Industry. d) Real robotic applications. e) Measurement with sensors. Manufacturing system of pharmaceutical (Liquid, Powder, capsules, Tablets,etc)								04

	<p>f) Any one Textile manufacturing process, Method to process and mechanisms/machines used for it.</p> <p>g) Any one Textile processing process, method to process and mechanisms/machines used for it. Printing process, method to process and mechanisms/machines used for it. Air conditioning system of any vehicle</p>	
4	<p>Field/Market based survey</p> <p>Survey report in areas(any one) like:</p> <p>a) Job opportunities of Mechanical</p> <p>b) Engineers in particular region.</p> <p>c) Customer requirements/satisfaction.</p> <p>d) Demand forecasting of any one</p> <p>e) Engineering product.</p>	10
Notes		
<ol style="list-style-type: none"> 1. Prepare the report with A4 size paper,30mm left margin,20mm top, bottom and right margins, Arial font of size 14 for titles and size 12 for detail content, single spacing, prepared in MS Word, print on one side of paper. 2. Title 3. Objectives of minor project 4. Important definitions 5. Brief description of selected topic 6. Data and data collection methods(as applicable) 7. Synthesis of data collected 8. Analysis 9. Power point presentation for minimum 10 minutes. 		