PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **B. Tech. (Mechanical Engineering)** Semester –VI

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
BT-16101	Ethical Hacking & Cyber Security	3	1	-	(70)	(30)	Min: 40 (D Grade	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test-- Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment/ Quiz/Attendance Max. Marks: Nil

Pre-Requisite	Student should have basic knowledge of computer.
Course Outcome	1. Identify and analyze the stages an ethical hacker requires to take in order to compromise a target system.
	2. To identify tool and techniques to carry out a penetration testing.

Unit	Contents *(Theory)*	Marks Weightage
I	**Introduction**: Understanding the importance of security, Concept of ethical hacking and essential Terminologies-Threat, Attack, Vulnerabilities, Target of Evaluation, Exploit. Phases involved in hacking, **Foot printing:** Introduction to foot printing, Understanding the information gathering methodology of the hackers, Tools used for the reconnaissance phase.	**14**
II	**System-Hacking**-Aspect of remote password-guessing Role of-eavesdropping, Various methods of password cracking, Keystroke Loggers, Understanding Sniffers, Comprehending Active and Passive Sniffing, ARP Spoofing and Redirection, DNS and IP Sniffing, HTTPS Sniffing.	**14**
III	**Hacking Wireless Networks:** Introduction to 802.1I,Role of WE?, Cracking WEP Keys, Sniffing Traffic, Wireless DOS attacks, WLAN Scanners, WLAN Sniffers, Hacking Tools, Securing Wireless Networks.	**14**
IV	**Introduction to Cybercrime:** Defining Cybercrime, Understanding the Importance of Jurisdictional Issues, Quantifying Cybercrime, Differentiating Crimes That Use the Net from Crimes That Depend on the Net, working toward a Standard Definition of Cybercrime, Categorizing Cybercrime, Developing Categories of Cybercrimes, Prioritizing Cybercrime Enforcement, Reasons for Cybercrimes.	**14**
V	**Introduction to Cybercrime:** Defining Cybercrime, Understanding the Importance of Jurisdictional Issues, Quantifying Cybercrime, Differentiating Crimes That Use the Net from Crimes That Depend on the Net, working toward a Standard Definition of Cybercrime, Categorizing Cybercrime, Developing Categories of Cybercrimes, Prioritizing Cybercrime Enforcement, Reasons for Cybercrimes.	**14**

Text Book/References Books/ Websites:

1. Aare, LuniverPress;NetworkSecurity;Ethical Hacking Rajat. 30-Nor-2006
2. Thomas Mathew ;Ethical !lacking;0571 Publisher, 28-Nor-2003

Suggested List of Laboratory Experiments : (Expandable):- Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External	Internal	Total
BT-16102	Human Health & Nutrition Disorder	3	1	-	(70)	(30)	Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks : 30	Best of Two Mid Semester Test-Max Marks : 20	Assignment/Quiz/Attendance – Max. Marks : 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks : Nil	Assignment / Quiz /Attendance – Max. Marks : Nil

Pre-Requisite	Nil
Course Outcome	1. To understand basic concepts in food and nutrition.
	2. To be able to know different types of nutrients.
	3. To know the basic food groups and methods of cooking.

Unit	Contents(Theory)	Marks weightage
I	**Basic concepts in food and nutrition:** • Basic terms used in study of food and nutrition • Understanding relationship between food nutrition and health • Functions of food-Physiological, Psychological and social	**14**
II	**Nutrients:** • Functions, dietary sources and clinical manifestation of deficiency / excess of the following nutrients: • Carbohydrates, Lipids and Proteins • Fat soluble vitamins – A,D,E and K • Water soluble vitamins- thiamin, riboflavin, niacin, pyridoxine, Foliate, vitamin B12 and vitamin C • Minerals- calcium, iron and iodine	**14**
III	**Food Groups:** • Selection, nutritional contribution and changes during cooking of the following food group: ▪ Cereals ▪ Pulses ▪ Fruits and vegetables. ▪ Milk and milk products ▪ Eggs ▪ Meat, poultry and fish ▪ Fats and oils	**14**
IV	**Methods of cooking and preventing nutrient losses:** • Dry, moist, frying and microwave cooking • Advantages disadvantages and the effect of various methods of cooking on nutrition's • Minimizing nutrient losses	**14**

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V	**Nutritional Problems and programs:** • Nutritional problems in India • National nutritional policy • National nutritional program in India.	**14**

Text Book/References Books/ Websites:

1. Swaminathan; M Hand book of foods and nutrition fifth Ed : 1986 Bappco,
2. Srilakshmi B; nutrition science 2012;New Age international (P) LTD.
3. Mudambi, SR and Rajagopal; mv fundamentals of foods Nutrition and Diet Therapy;Fifth Ed: 2012
4. Potter N.M Hotchkiss;Jh Food Sciences; Fifth ed.2006
5. Khanna K Gupta S Seth R Mahana R. Rekhi T. ;The AM an and Science of cooking
6. Suri.s and malhotra; A food science nutrition & Food safety pearson india LTD 2014.

Suggested List of Laboratory Experiments (Expandable):- Nil

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Programme: **B. Tech. (Mechanical Engineering)** Semester –VI

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total
BT-16103	Human Resource Management	3	1	-	(70)	(30)	Min: 40 (D Grade	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test-- Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: Nil	Lab work & Sessional – Max Marks: Nil	Assignment/ Quiz/Attendance Max. Marks: Nil

Pre-Requisite	Student should have basic knowledge of computer.
Course Outcome	1. The objective of the course is to equip students with various human resource management concepts and current practices in managing human resources in knowledge based environment.

Unit	Contents *(Theory)*	Marks Weightage
I	**Introduction to Human Resource Management:** Definition and Concept, Features, Objectives, Functions, Scope and Development of Human Resource Management, Importance of Human Resource Management, Human Resource Planning.	**14**
II	**Job Analysis and Design:** Job Analysis, Job Description, Job Specification, Job Design, Recruitment, Selection.	**14**
III	**Induction Programme:** Contents, Need for Induction. **Training**: Concept and Significance of Training, Training Needs, Training Methods, Types of Training.	**14**
IV	**Performance Appraisal:** Concept of Performance Appraisal, Purpose of performance appraisal, Process, Methods of Performance Appraisal, Major Issues in Performance Appraisal.	**14**
V	**Industrial Relation & Trade Unions:** Employee welfare, Employees Empowerment, Grievance procedure ,Collective Bargaining, Settlement of Disputes, Human Resource Accounting, Separation, Retirement Schemes, Resignation, Suspension, Layoff.	**14**

Text Book/References Books/ Websites:

1. Gupta & Joshi, 'Human Resource Management', Kalyani Publication, 2nd Edition 2004.
2. Rao VSP, Human Resource Management, Excel Books, New Delhi2005.
3. Aswathappa, K. 'Human Resource and Personnel Management', Tata McGraw-Hill, 1997.
4. Gupta, P.K., Human Resource Management, Dreamtech Press, 2011.
5. Mamoria C.B., 'Personnel Management', Himalaya Pub. House.6. Khanka S.S, 'Human Resource Management' S.Chand, New Delhi,2009.
6. Dessler Gary, 'Human Resource Management', PHI, New Delhi,10th Edition, 2005.
7. Bhattacharya D.K. Human Resource Management, Excel Books, New Delhi, 2006.

Suggested List of Laboratory Experiments : (Expandable):- Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External (70)	Internal (30)	Total (100)	External	Internal	Total
MET-1602	Production Planning and Control	3	1	-			Min: 40 (D Grade)	Nil	Nil	Nil

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance- Max. Marks: 10
Practical Internal Max Marks: - Nil	Lab work & Sessional – Max Marks: -Nil	Assignment / Quiz/attendance- Max. Marks: -Nil

Pre-Requisite	General study of management and Entrepreneurship
Course Outcome	1. Know types of ownerships, the organisation structure of an industry and the behaviour of an individual in an organisation.
	2. Understand the different aspects of production management.
	3. Understand the role of materials management industries.

Unit	Content (Theory)	Marks Weightage
I	**Production Management:** Definition, Objectives, Scope, Benefits, Functions of production management, Place of production management in an organization, Types of production system, Product life cycle, Product design and development, production cycle. **Costing and Cost Analysis:** Elements of costs Break even analysis, Incremental costs, decision, **Sales Forecasting:** Purposes, Methods – Delphi, Linear regression, Economic indicators, Time-series analysis, Moving average, Exponential smoothing.	**14**
II	**Inventory models**: Necessity of inventory in process and safety stock, problem of excess inventory and cycle time (=WIP/ Throughput), JIT/ lean mfg; basic EOQ/ EPQ models for constant review Q-system(S,s); periodic review, base stock P-system; service level, lead time variance and safety stock;; ABC, VED and other analysis based on shelf life, MRP technique and Calculations, lot sizing in MRP, linking MRP with JIT; evolution of MRP ,& ERP. Inventory control under risk and uncertainty.	**14**
III	**Production Planning and Control** : Functions, Organization, Master Scheduling, Aggregate planning and strategies, Materials requirement planning, Product structure tree, Routing, Loading, Scheduling – forward and backward, Dispatching – priority rules, Sequencing, Gantt's Chart, Bar chart, Flow process chart.	**14**
IV	**Material Management:** Objectives and functions of materials management, Organization of materials management, MRP I and MRP II. **Materials Handling:** Principles of materials handling, Unit load, Types of materials handling equipment, Relation between materials handling and plant layout.	**14**
V	**Procurement:** Objectives of purchase department, Purchase responsibilities and organization, Types of purchasing, Purchase procedures, Import and Export. **Stores Keeping:** Stores management, Functions of stores, Classification of materials, Standardization of materials, Identification and maintenance of layout of stores, Physical control of materials, Pricing of stores, Issuing of stores. **Supply Chain Management:** Introduction, Definition of supply Chain, Major derivers of supply chain, Supply Chain Strategies, A model for strategy formulation in SCM. Information Systems in supply chain.	**14**

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Programme: **B. Tech. (Mechanical Engineering)** Semester –VI

Text Book/References Books/ Websites:

1 P. Ramamurty; Production and operation Management; New Age International Publication.
2 Martand Telsang; Industrial Engineering & Production Management; S. Chand & Co.
3 R.P. Mohanty & S G Deshmukh; Supply Chain Management; SBiztantra Publications.
4 R. Mayer; Production and operation Management; Tata McGraw Hill publication.
5 Juran and Gryna; Quality Planning and Analysis, Tata McGraw Hill publication
6 Adam and Ebert; Production and operations Management; PHI

Suggested List of Laboratory Experiments : (Expandable):- Nil

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total (100)	External	Internal	Total (50)
MET-1603	Machine Design - I	3	1	1	(70)	(30)	Min: 40 (D Grade)	(35)	(15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance- Max. Marks: 05

Pre-Requisite	Engineering Drawing.
Course Outcome	1. Student should be able to Use IS convention of representing various machine components
	2. Interpret drawings and the assembly of a given set of details of machine components.
	3. Know the significance & use of tolerances of size, forms & positions.

Unit	Contents (Theory)	Marks Weightage
I	**Stress concentration and fatigue:** causes of stress concentration; stress concentration in tension, bending and torsion; reduction of stress concentration, theoretical stress concentration factor, notch sensitivity, fatigue stress concentration factor, cyclic loading, endurance limit, S-N Curve, loading factor, size factor, surface factor. Design consideration for fatigue, Goodman and modified Goodman's diagram, Soderberg Equation, Gerber Parabola, Design for finite life, cumulative fatigue damage factor.	**14**
II	**Riveted Joints:** Types of rivet heads, Types of Riveted Joints, Failure of riveted joint, Strength of rivet joint, Efficiency of riveted joint, Design of riveted joint, Eccentrically loaded riveted joint. **Welded joint:** Types of Welded Joints, Stresses in Butt and Fillet welds, Strength of welded joints, Location and dimension of weld design, Eccentrically loaded joint, Welded joint subjected to bending moment, Design procedure, Stress relieving techniques. **Springs**: Design of helical compression and tension springs, leaf springs and torsion springs; fatigue loading of springs, surge in spring;	**14**
III	**Basic Elements Design**: Introduction of Shafts, Design of shaft under combined bending, twisting and Axial Loading; shock and Fatigue Factors, Design for Rigidity; Design of shaft subjected to static &dynamic load; Design of keys and shaft couplings, muff, flange, flexible etc.	**14**
IV	**Brakes & Clutches:** . Design of brakes: Rope, band & block brake, Internal expending brakes, Disk brakes, Materials for Friction Surface, Uniform Pressure and Uniform Wear Theories, Design of friction clutches: Disk, plate clutches, cone & centrifugal clutches	**14**
V	**Journal Bearing:** Types of Lubrication, Viscosity, Hydrodynamic Theory, Design Factors, Temperature and Viscosity Considerations, Reynolds's Equation, Stable and unstable operation, heat dissipation and thermal equilibrium, boundary lubrication, dimensionless numbers, Design of journal bearings, **Rolling-Element Bearings:** Types of Rolling Contact Bearing, Bearing Friction and power Loss, Bearing Life; Radial, Thrust & Axial Loads; Static & Dynamic Load Capacities; Selection of ball and roller bearings; lubrication and sealing.	**14**

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Text Book/References Books/ Websites:

1. V.B.Bhandari; Design of Machine Elements; Tata Mc- Graw Hill.
2. R.K.Jain; Machine Design; Khanna Publication.
3. Abdulla Shariff; Hand Book of Properties of Engineering Materials & Design Data for Machine Elements; Dhanpat Rai & Sons
4. P.C. Sharma and D.K. Aggarwal, A Text Book of Machine Design; S.K. Kataria & Sons.
5. Joseph Edward Shigley; Mechanical Engg. Design Mc-Graw Hill
6. Design Data Book by V.B. Bhandari.
7. Design Data Book by PSG Coimbtore.
8. Design Data Book by Mahadevan.

Suggested List of Laboratory Experiments :- (Expandable):

Prepare drawing sheets on following topics.

1. Types of line, and Dimensioning System.
2. Sheet of Tolerance Symbols, Positioning, Surface Finishing and Welding Symbols.
3. Use first angle method of projection, Orthographic projects (One Sheet containing atleast two problems and atleast four problems for home assignment).
4. Sectioning views: projects (One Sheet containing atleast two problems and atleast four problems for home assignment).
5. Conventional Representation as per SP – 46 (1988) - one sheet.
6. Details to Assembly: Draw sheets covering assembly drawing and its details for given machine parts.
7. One sheet of Gear terminology and construction of involutes gear profile.
8. Pipe fitting and pipe layout: C.I. and PVC.
9. Two problems on assembly drawings using any CAD Package.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total (50)
MET-1604	Refrigeration & Air Conditioning	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance- Max. Marks: 10
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance- Max. Marks: 05

Pre-Requisite	General study of Energy Sources.
Course Outcome	1. Understand the basic concepts of refrigeration and air conditioning systems.
	2. Understand and analysis of various refrigeration cycles.
	3. Make basic calculation of psychometric properties and process.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** Principles and methods of refrigeration, freezing; mixture cooling by gas reversible expansion, throttling, evaporation, Joule Thomson effect and reverse Carnot cycle; unit of refrigeration, coefficient of performance, vortex tube & thermoelectric refrigeration, adiabatic demagnetization; air refrigeration cycles- Joule's cycle Boot-strap cycle, reduced ambient cycle and regenerative cooling cycles.	**14**
II	**Vapour compression system:** Vapor compression cycle, p-h and t-s diagrams, deviations from theoretical cycle, sub-cooling and super heating, effects of condenser and evaporator pressure on cop; multi-pressure system: removal of flash gas, multiple expansion & compression with flash inter cooling; low temperature refrigeration: production of low temperatures, cascade system, dry ice, production of dry ice, air liquification system. Refrigeration Compressors,	**14**
III	**Vapour absorption system:** Theoretical and practical systems such as aqua-ammonia, Electrolux & other systems; **Steam jet refrigeration**: Principles and working, simple cycle of operation, description and working of simple system; **refrigerants:** nomenclature & classification, desirable properties, common refrigeration, comparative study, leak detection methods, environment friendly refrigerants and refrigerant mixtures, brine and its properties.	**14**
IV	**Psychrometric:** Calculation of psychometric properties of air by table and charts; psychrometric processes: sensible heating and cooling, evaporative cooling, cooling and dehumidification, heating and humidification, mixing of air stream, sensible heat factor; principle of air conditioning, requirements of comfort air conditioning, ventilation standards, infiltrated air load, fresh air load human comfort, effective temperature & chart, heat production & regulation of human body.	**14**
V	**Air conditioning loads:** calculation of summer & winter air conditioning load, bypass factor of coil, calculation of supply air rate & its condition, room sensible heat factor, grand sensible heat factor, effective sensible heat factor, dehumidified air quantity. Problems on cooling load calculation. Air distribution and ventilation systems	**14**

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Programme: **B. Tech. (Mechanical Engineering)** Semester –VI

Text Book/References Books/ Websites:

1 C.P Arora.; Refrigeration and Air Conditioning; TMH
2 SN Sapali; Refrigeration and Air Conditioning; PHI
3 Manohar Prasad; Refrigeration and Air Conditioning; New Age Pub
4 Ameen; Refrigeration and Air Conditioning; PHI
5 Pita ; Air conditioning Principles and systems: an energy approach; PHI
6 W.F Stoecker, Jones J; Refrigeration and Air conditioning; TMH.
7 RC Jordan and GB Priester Refrigeration and Air Conditioning, PHI USA

Suggested List of Laboratory Experiments (Expandable):

1. Study of vapor compression refrigeration system.
2. Study of Ice Plant.
3. Study and working of cold storage
4. Study Trane Air Condition (Package Type).
5. Study of Electrolux Refrigeration.
6. Study One tone Thermax refrigeration unit.
7. Study of Water cooler.
8. Study of Psychrometers (Absorption type).
9. Study of Leak Detectors (Halide Torch).
10. Study and working of Gas charging Rig.
11. Study of window Air Conditioner.
12. Study and working of Vapor compression Air conditioning Test rig.
13. Experimentation on Cold Storage of Calculate COP & Heat Loss.
14. Experimentation on Vapor compression Air Conditioning test rig.
15. Changing of Refrigerant by using Gas Charging Kit.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total (100)			Total
MET-1605	Machine Tools and Operations	3	1	1	External (70)	Internal (30)	Min: 40 (D Grade)	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): 3 Hours

Theory Internal- Max Marks: 30	Best of Two Mid Semester Test – Max Marks: 20	Assignment/Quiz/Attendance- Max. Marks: 05
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance- Max. Marks: 05

Pre-Requisite	Nil
Course Outcome	1. Ability to apply the fundamentals knowledge of machine and tools.
	2. To understand the basic operations of machining.

Unit	Contents (Theory)	Marks Weightage
I	**Introduction:** cutting motion in machine tools, requirements, characteristics, process capability of machine tool, elements of machine tool, kinematics of machine tool drives, hydraulic and electric drives, gear box, standardizations of machine tool drives, vibrations of machines, dynamics rigidity, chip disposal, maintenance of machine tool.	**14**
II	**Theory of Metal Cutting:** Single point cutting tool nomenclature, geometry. Mechanics of Chip Formation, Types of Chips. Merchants circle diagram and analysis, Ernst Merchant's solution, shear angle relationship, problems of Merchant's analysis. Tool Wear and Tool failure, tool life. Effects of cutting parameters on tool life. Tool Failure Criteria, Taylor's Tool Life equation. Problems on tool life evaluation. Desired properties and types of cutting tool materials. Cutting fluids, function of cutting fluid, types of cutting fluid. Desired properties, types and selection. Heat generation in metal cutting, factors affecting heat generation. Heat distribution in tool and work piece and chip. Measurement of tool tip temperature.	**14**
III	**Metrology and Inspection:** Limits, fits and tolerances; linear and angular measurements; comparators; gauge design; interferometry; form and finish measurement; alignment and testing methods; tolerance analysis in manufacturing and assembly.	**14**
IV	**Lathe** : size, specifications, operations-facing, turning, knurling, taper turning, thread cutting, drilling, chamfering, boring, reaming, work holding devices & tools, mechanism and attachments for various operations. Planning operations, operation performed on shaper machine. Numericals based on cutting speed, material removal rate, depth of cut etc.	**14**
V	**Reaming & Boring**: Principle of operation, parts and types of operations, tools. Numericals based on cutting speed, material removal rate, depth of cut etc. **Grinding**: Processes, machines, design consideration for grinding, specification of grinding wheel, process parameters and economics of grinding.	**14**

Text Book/References Books/ Websites:

1 P.N. Rao ; Manufacturing Technology (Vol. – I & II) ; Tata McGraw Hill, New Delhi
2 P.C. Sharma; A Text Book of Production Technology (Manufacturing Processes); S. Chand and Company Ltd., New Delhi.
3 A. Ghosh & A.K. Mallik; Manufacturing Science; East West Press Pvt. Ltd., New Delhi
4 R.K. Jain; Production Technology; Khanna Publishers, New Delhi
5 O.P. Khanna; A Text Book of Production Technology (Vol. I & II); Dhanpat Rai & Sons,

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Suggested List of Laboratory Experiments (Expandable):

1. Study of various types of machine tool.
2. Study of various types of cutting tool.
3. Study of mechanism of chips formations.
4. Study of tool failure.
5. study of linear measuring instruments
6. study of angular measuring instruments
7. Study of various types of operations performed on lathe machine.
8. Study of various types of operations performed on shaper machine.
9. Study of various types of operations performed on milling machine.
10. Study of various types of operations performed on grinding machine.

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P			Total			Total (50)
MET-1606	CNC & Metal Cutting Lab	-	-	1	External (Nil)	Internal (Nil)	Nil	External (35)	Internal (15)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance- Max. Marks: Nil
Practical Internal Max Marks: 15	Lab work & Sessional – Max Marks: 10	Assignment / Quiz/Attendance Max. Marks: 05

Pre-Requisite	Basic mechanical workshop practice.
Course Outcome	1. Ability to understand the basics of automation and Computer numerical control tools.
	2. This course would encompass a comprehensive study of metal cutting and machine tools.
	3. Ability to elaborate on the theory of metal cutting supplemented with numerical problems.

Unit	Contents (Theory)	Marks Weightage
I	A study would be made on fixed automation, Computer numerical control (CNC) machines, gear cutting machines, non-traditional machine tools and Rapid prototyping, together with numerical problem solving. This course would elaborate on the theory of metal cutting supplemented with numerical problems. Tool geometry, chip formation, cutting force calculations and measurement, tool wear and other aspects will be given due attention. This would be followed by a descriptive study of the machine tools like lathe, milling, grinding, drilling and shaping machines, followed by numerical problems.	**50**

Text Book/References Books/ Websites:

1. A Ghosh and A K Mallik; Manufacturing Science: PEARSON India
2. A B Chattopadhyay; Machining and Machine tools: Wiley
3. A Bhattacharya; Metal Cutting – Theory and Practice: New Central Book Agency

Suggested List of Laboratory Experiments (Expandable):

1. Step Turning and Taper Turning on Lathe
2. Thread Cutting and Knurling on Lathe
3. Machining Flat Surface using Shaper Machine
4. Manufacturing of Spur Gear using Milling Machine
5. Making Internal Splines using Slotting Machine
6. Drilling, Tapping & Grinding
7. Grinding of Single Point Cutting Tool
8. Planning Machine
9. Study and Practice of Orthogonal & Oblique Cutting on a Lathe
10. Machining time calculation and comparison with actual machining time while cylindrical turning on a lathe and finding out cutting efficiency

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Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External	Internal	Total (50)
BT-1607	Research Methodology	-	-	1	(Nil)	(Nil)	Nil	(Nil)	(50)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: 50

Pre-Requisite	Nil
Course Outcome	1. Understand some basic concepts of Research and its Methodologies.
	2. Assess critically the following methods: literature study, case study, structured surveys, interviews, focus groups, participatory approaches, narrative analysis, cost-benefit analysis, and scenario methodology and technology foresight.

Unit	Contents (Theory)	Marks Weightage
I	**Objectives and Types of Research:** Motivation and objectives – Research methods *vs.* Methodology. Types of research – Descriptive *vs*. Analytical, Applied *vs*. Fundamental, Quantitative *vs*. Qualitative, Conceptual *vs*. Empirical.	50
	Research Formulation – Defining and formulating the Research Problem - Selecting the problem Necessity of defining the problem - Importance of literature review in defining a problem.	
	Research Design and Methods – Research design – Basic Principles- Need of Research Design Features of good design – Important Concepts Relating to Research Design – Observation and Facts. Developing a research plan - Exploration, Description, Diagnosis, and Experimentation.	
	Data Collection and Analysis: Execution of the Research - Observation and Collection of data Methods of data collection – Sampling Methods- Data Processing and Analysis Strategies -Data Analysis with Statistical Packages - Hypothesis-testing - Generalization and Interpretation.	
	Reporting and Thesis Writing – Structure and Components of Scientific Reports - Types of report – Technical reports and thesis – Significance – Different Steps in the preparation – Layout, Structure and Language of typical reports – Illustrations and tables - Bibliography, Referencing and Footnotes.	

Text Book/References Books/ Websites:

1. Garg, B.L., Karadia, R., Agarwal, F. and Agarwal, U.K., 2002. An introduction to Research Methodology, RBSA Publishers.
2. Kothari, C.R., 1990. Research Methodology: Methods and Techniques. New Age International. 418p.
3. Sinha, S.C. and Dhiman, A.K., 2002. Research Methodology, Ess Ess Publications. 2 volumes.
4. Trochim, W.M.K., 2005. Research Methods: the concise knowledge base, Atomic Dog Publishing. 270p.

Suggested List of Laboratory Experiments (Expandable): Nil

PEOPLE'S UNIVERSITY, BHOPAL

(Applicable for Admitted from Academic Session 2019-20 onwards)

Programme: **B. Tech. (Mechanical Engineering)** Semester –VI

Subject Code	Subject Title	Credit			Theory			Practical		
		L	T	P	External	Internal	Total	External	Internal	Total (50)
BT-1608	GD/Seminar	-	-	1	(Nil	(Nil)	Nil	(Nil)	(50)	Min: 20 (D Grade)

Duration of Theory (Externals): Nil

Theory Internal- Max Marks: Nil	Best of Two Mid Semester Test – Max Marks: Nil	Assignment/Quiz/Attendance Max. Marks: Nil
Practical Internal Max Marks: 50	Lab work & Sessional – Max Marks: Nil	Assignment / Quiz/Attendance Max. Marks: 50

Pre-Requisite	Nil
Course Outcome	1. Develop confidence and students should able to share their views publically.
	2. Understand and critique scientific presentations

Unit	Contents (Theory)	Marks Weightage
	Objective of GD and seminar is to improve the Mass Communication and Convincing/ understanding skills of students and it is to give student an opportunity to exercise their rights to express themselves. Effective power point presentation of scientific research of concern discipline where students will prepare, practice, and present short scientific seminars, and receive feedback from each other that will help us give even better presentations in the future. This effort will help them to communicate their ideas more clearly. Evaluation will be done by assigned faculty based on group discussion and power point presentation.	**50**

Text Book/References Books/ Websites: Nil

Suggested List of Laboratory Experiments :- (Expandable):

Students should prepare and submit hard and soft copy of their report to assigned faculty before End Semester.