SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)

---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DC	Subject Code:	AE-601	Subject Name:	**Post Harvest Engineering for Cereals Pulses & Oil Seeds**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	20	10	150	3	-	2	4

Prerequisites:

Course Objective:

The students would be exposed to fundamental knowledge in engineering properties of agricultural materials, different Post Harvest operations and processing methods of harvested crops and storage of crops

Course Outcomes:

At the end of the study the student will have knowledge on

1. Fundamental knowledge in engineering properties of agricultural materials
2. Different Post Harvest operations and processing methods of harvested crops.
3. Material handling equipment

UNITs	Descriptions	Hrs.	CO's
I	**FUNDAMENTALS OF POST HARVESTING** Post harvest technology – introduction, objectives, post harvest losses of cereals, pulses and oilseeds, importance - optimum stage of harvest. Threshing – traditional methods mechanical threshers, types, principles and operation. moisture content measurement, direct and indirect methods, moisture meters, equilibrium moisture content	8	CO1
II	**PSYCHROMETRY AND DRYING** Psychrometry – importance, Psychrometric charts and its uses. Drying – principles and theory of drying, thin layer and deep bed drying, Hot air drying, methods of producing hot air, Types of grain dryers, selection, construction, operation and maintenance of dryers ,Design of dryers	8	CO2
III	**CLEANING AND GRADING** Principles, air screen cleaners, adjustments , cylinder separator, spiral separator, magnetic separator, colour sorter, inclined belt separator, length separators, effectiveness of separation and performance index	8	CO2
IV	**SHELLING AND HANDLING** Principles and operation, husker sheller for maize, groundnut decorticator, castor sheller. Material handling – belt conveyor, screw conveyor, chain conveyor, bucket elevators, pneumatic conveying.	8	CO3
V	**CROP PROCESSING** Paddy processing – parboiling of paddy, methods, merits and demerits, dehusking of paddy – methods, merits and demerits rice polishers –types, constructional details, polishing, layout of modern rice mill, wheat milling,	8	CO2

	pulse milling methods, oil seed processing, millets processing.		
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. Determination of moisture content of grains by oven method and moisture meter.
2. Determination of porosity of grains.
3. Determination of coefficient of friction and angle of repose of grains.
4. Evaluation of thin layer drier
5. Evaluation of L.S.U. drier.
6. Determining the efficiency of bucket elevator and screw conveyor
7. Evaluation of shelling efficiency of rubber roll sheller
8. Determining the oil content of oil seeds.
9. Visit to modern rice mill
10. Visit to pulse milling industry

Text Book-

1. Chakraverty, A.Post harvest technology for Cereals, Pulses and oilseeds. Oxford & IBH publication Pvt Ltd, New Delhi, Third Edition, 2000.
2. Sahay, K.M., and Singh, K.K. Unit operations of Agricultural Processing. Vikas publishing house Pvt. Ltd., New Delhi, 1994.

Reference Books-

1. Pande, P.H. Principles of Agriculture Processing. Kalyani Publishers, Ludhiana, 1994.
2. Henderson, S.M. and R.L. Perry. Agricultural Process Engineering. John Wiley and Sons, New York. 1955.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

Recommendation by Board of studies on	14.12.2023
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DC	Subject Code:	AE-602	Subject Name:	**Drainage Engineering**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	100	3	-	2	4

Prerequisites:

Course Objective:

Course Outcomes:

After completion of the course, the student will be able to:

1. Understand drainage problems in agricultural lands.
2. Understand usefulness and design considerations under steady and non-steady state drainage.
3. Acquire information on different drainage systems components and structures.
4. Reclamation of problematic soil by drainage

UNITs	Descriptions	Hrs.	CO's
I	Introduction of Drainage, objectives of drainage, drainage problems, Surface drainage, drainage coefficient, types of surface drainage, design of open channel	7	CO1,CO3
II	Sub-surface drainage purpose and benefits, investigations of design parameters, hydraulic conductivity, drainable porosity, water table, types and use of subsurface drainage system, Design of surface drains.	8	CO2
III	Derivation of ellipse (Hooghoudt's) and Ernst's drain spacing equations, Design of subsurface drainage system. Drainage materials, drainage pipes, drain envelope	9	CO2,
IV	Layout, construction and installation of drains, Drainage structures, Vertical drainage, Biodrainage, Tile Drains, interceptor and relief drains.	8	CO3
V	Drainage of irrigated and humid areas, Salt balance, reclamation of saline and alkaline soils. Leaching requirements, conjunctive use of fresh and saline waters, Economic aspects of drainage	8	CO4
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. In-situ measurement of hydraulic conductivity;
2. Determination of drainage coefficients;
3. Preparation of isobaths and isobar maps;
4. Measurement of hydraulic conductivity and drainable porosity;
5. Design of surface drainage and subsurface drainage systems;
6. Fabrication of drainage tiles;
7. Installation of subsurface drainage system;

8 Cost analysis of surface and sub-surface drainage system.
Text Book-
Reference Books- 1.Land and water management: Principles and Practices, By: V.V.N. Murthy 2.Horizontal Drainage System design, By: Dr. Cheddi Lal 3.Principles of Agricultural Engineering Vol-II, By: A.M. Michael & T.P. Ojha 4. Agriculture drainage, By: Dr. A.K. Bhattacharya
Modes of Evaluation and Rubric
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.
List/Links of e-learning resource

Recommendation by Board of studies on	14.12.2023
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Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech					
Subject Category	DE-III	Subject Code:	AE-603 (A)	Subject Name:	**Agriculture Structures and Environment Control**					
Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical		Total Marks					
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work		L	T	P	
60	20	10	10			100	3	1		4

Prerequisites:

Course Objective:

To make students familiar with different farm structures with environmental control parameters

Course Outcomes:

After completion of the course, the student will be able to:

1. Understand the importance of planning and lay out of a farmstead
2. Know about various standards for various dairy, piggery, poultry and other farm structures
3. Know about the different farm storage structures, silos, compost pit, implement sheds, farm houses, threshing floors, farm roads, fencing, water supply, sewage systems, and septic tanks.

UNITs	Descriptions	Hrs.	CO's
I	Planning and layout of farmstead. Scope, importance and need for environmental control, physiological reaction of livestock environmental factors, environmental control systems and their design, control of temperature, humidity and other air constituents by ventilation and other methods, Livestock production facilities, BIS Standards for dairy, piggery, poultry and other farm structures.		CO1,CO2
II	Design, construction and cost estimation of farm structures; animal shelters, compost pit, fodder silo, fencing and implement sheds, barn for cows, buffalo, poultry, etc.		CO2
III	Storage of grains, Causes of spoilage, Water activity for low and high moisture food and its limits for storage, Moisture and temperature changes in grain bins; Traditional storage structures and their improvements, Improved storage structures (CAP, hermetic storage, Pusa bin, RCC ring bins), Design consideration for grain storage godowns, Bag storage structures, Shallow and Deep bin, Calculation of pressure in bins, Storage of seeds.		CO3
IV	Rural living and development, rural roads, their construction cost and repair and maintenance Sources of water supply, norms of		CO3

	water supply for human being and animals, drinking water standards and water treatment suitable to rural community.		
V	Site and orientation of building in regard to sanitation, community sanitation system; sewage system and its design, cost and maintenance, design of septic tank for small family. Estimation of domestic power requirement, source of power supply and electrification of rural housing.		CO3
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

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Text & Reference Book-

1. Pandey, P.H. Principles and practices of Agricultural Structures and Environmental Control, Kalyani Publishers, Ludhiana
2. Ojha, T.P. and Michael, A.M. Principles of Agricultural Engineering, Vol.1, Jain Brothers, Karol Bag, New Delhi
3. Nathonson, J.A. Basic Environmental Technology, Prentice Hall of India, New Delhi
4. Garg, S.K. Water Supply Engineering, Khanna Publishers, New Delhi
5. Dutta, B.N. Estimating and Costing in Civil Engineering, Dutta & Co, Luc know
6. Sahay, K.M. and Singh, K.K. Unit Operations of Agricultural Processing, Vikas pub. pvt. Ltd, Noida
7. Banerjee, G.C. A Text Book of Animal Husbandry, Oxford IBH Pub. Co., New Delhi

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

Recommendation by Board of studies on	14.12.2023
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Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DE-III	Subject Code:	AE-603(B)	Subject Name:	**Building Material & Structure Design**

Maximum Marks Allotted							Contact Hours			Total Credits
Theory				Practical		Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work		L	T	P	
60	20	10	10			100	3	1		4

Prerequisites:

Course Objective:

To make students familiar with different building materials, construction methods, estimation & Design of farm buildings and related structures

Course Outcomes:

After completion of the course, the student will be able to:

1. Understand the importance of various building materials for construction work
2. Design various reinforced concrete elements by working stress and limit state method.

UNITs	Descriptions	Hrs.	CO's
I	**Stones and bricks** Classification of rocks - Characteristics of Stones -Testing of Stones- Manufacture of Bricks -Moulding - Drying and Burning of bricks-Properties of good Brick -Classification of bricks -Clay Products-Ceramics - Tiles - Earthenware and Stoneware and uses	8	CO1
II	**Lime and cement** Lime- Natural Sources -Types of lime – Calcination-Cement -Raw materials – Water Cement Ratio- Manufacture of Portland Cement Wet and Dry process-Standard Specifications- Storage of cement-	8	CO1
III	Timber – Definition - Defects in timber-Qualities of good timber, Sand-Kinds, bulking of sand, tests for impurities	8	CO1
IV	Loads and use of BIS Codes. Design of connections. Design of structural steel members in tension, compression and bending. Design of steel roof truss.	8	CO2
V	Analysis and design of singly and doubly reinforced sections, Shear, Bond and Torsion. Design of Flanged Beams, Slabs, Columns, Foundations, Retaining walls and Silos.	8	CO2
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

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Text Book-

1. Deodhar, S.V. and Singhal, 2001. Civil engineering materials. Khanna publishers, 2B, Nath market, Naisark, Delhi -6.

2. Rangwala. S.C., 2000. Building construction. Charotar publishing house, Anand.

Reference Books-

1. Deodhar, S.V. and Singhal, 2001. Civil engineering materials. Khanna publishers, 2B, Nath Market, Naisark, Delhi -6.
2. Handoo, B.L. and Mahajan,V.M., 1995. Civil engineering materials. Sathyaprakasam, 16/7698, New market, New Rohtak road, New Delhi-5.
3. Junarkar, S.B. 2001. Mechanics of Structures Vol. I Charotar Publishing Home, Anand.
4. Khurmi R. S. 2001. Strength of materials. S. Chand & Company Ltd., 7361, Ram Nagar, New Delhi – 110055.
5. Kumar Sushil 2003. Treasure of R.C.C. Design. R.K. Jain. 1705-A, Nai Sarak , Delhi-110006,P.B.1074.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DE-III	Subject Code:	AE-603 (C)	Subject Name:	**PRECISION AGRICULTURE AND SYSTEM MANAGEMENT**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10				100	3	1	-	4

Prerequisites:

Course Objective:

Course Outcomes:

After completion of the course, the student will be able to:

1. Discuss the principles and processes of Precision Agriculture
2. Explain how Precision Agriculture operates in the Agriculture & horticulture production contexts
3. Utilize selected software package(s) to apply Precision Agriculture principles for improved production efficiency and sustainability

UNITs	Descriptions	Hrs.	CO's
I	Precision Agriculture – need and functional requirements. Familiarization with issues relating to natural resources. Familiarization with various machines for resource conservation	7	CO1
II	Familiarization with equipment for precision agriculture including sowing and planting machines, power sprayers, land clearing machines, laser guided land levellers, straw-chopper, straw-balers, grain combines, etc., optimization of fertilizer application rate for cereals and horticulture crop, increase nutrient use efficiency	8	CO2
III	Introduction to GIS based precision agriculture and its applications. Introduction to sensors and application of sensors for data generation. Problems related to cost analysis and inflation and problems related to selection of equipment, replacement.	9	CO3
IV	Database management. System concept. System approach in farm machinery management, problems on machinery selection, maintenance and scheduling of operations. Solving problems related to various capacities, pattern efficiency, system limitation	8	CO3
V	Application to PERT and CPM for machinery system management, break-even analysis, time value of money	8	CO3
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

Text Book-

1. Kuhar J E. The Precision Farming Guide for Agriculturist.
2. Dutta SK. Soil Conservation and land management.

3. Sigma and Jagmohan. Earth Moving Machinery. 4. Wood and Stuart. Earth Moving Machinery. 5. DeMess MN. Fundamentals of Geographic Information System. 6. Hunt Donnell. Farm Power and Machinery Management. Sharma DN and S Mukesh. Farm Power and Machinery Management Vol I.
Reference Books-
Modes of Evaluation and Rubric
Quiz, Assignment, Mid-term exam, End term exam and Practical Viva. Rubric: End term exam. Practical: 50% Quiz and 50% Viva.
List/Links of e-learning resource

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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DE-IV	Subject Code:	AE-604(A)	Subject Name:	**Food Science**

Maximum Marks Allotted							Contact Hours			Total Credits
Theory			Practical			Total Marks				
End Sem	Mid-Sem	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10				100	3	1		4

Prerequisites:

Course Objective:

Course Outcomes:

After completion of the course, the student will be able to:

1. knowledge of food chemistry, engineering and microbiology
2. the ability to carry out quality controls on food products
3. the development of new safe and quality foods with high nutritional value, attractiveness and safety for consumers

UNITs	Descriptions	Hrs.	CO's
I	**Introduction** Definition of Food Science: Role of food science in augmenting food supplies; activities of food scientists; characteristics of Indian food industry. **Structure of Food** Physical structures of foods; appearance texture' and flavour of foods, and their; use in assessment of food quality.	7	CO1
II	**Food Constituents** **Water:** water contents of foods, physical contents of water and ice, structure of water molecule and pure ice, association of water molecules, water, solute interaction, water-activity, solute mobility and food stability. **Carbohydrates:** Structure and nomenclature of carbohydrates, carbohydrate, of major importance In foods; hydrolysis, dehydration and browning reactions.	8	CO1
III	**Lipids:** Definition and classification, role and use of lipids in food, hydrolytically and oxidative rancidity, emulsions. **Proteins:** Type, structure and terminology, functional properties, distribution of proteins in various foods, denaturation of proteins, unconventional sources of proteins. **Enzymes** Enzyme nomenclature definitions, kinematics of enzyme activity, factors effecting enzyme	8	CO1

IV	**Microorganisms and Food** Classification and identification of micro organisms; factors effecting growth of micro organisms, kinetics of microbial growth and inactivation; sources of microbial contamination of foods; important micro organisms causing food spoilage; food poisoning; microbial production of ethanol and acetic acid.	9	CO2
V	**Food Laws, Food Standards and Food Safety** Indian food laws and their enforcing agencies; food standards, their role and maintenance in food industry; food adulteration, its causes; common adulteration and methods of detection.	8	CO3
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

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Text and Reference Book-

1. Potter, N.N. "Food Science", The A VI Publishing Company, 1986.
2. Desrosier, N.W. and Desrosier, J.N. "The technology of food preservation". The AVI Publishing Company, 1977.
3. Fennema, O.R. "Food Chemistry", Marcel Dekhar. 1976.
4. Frazier, W.C. "Food Microbiology". McGraw Hill Book Company.

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

Recommendation by Board of studies on	14.12.2023
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

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---------AGRICULTURAL ENGINEERING----------

Semester/Year		VI/III	Program		B.Tech
Subject Category	DE-IV	Subject Code:	AE-604 (B)	Subject Name:	**Groundwater, Wells and Pumps**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work			L	T	P	
60	20	10	10	-	-	-	100	3	1		4

Prerequisites:

Course Objective:

Course Outcomes:

After completion of the course, the student will be able to:

1. Apply the knowledge of aquifer parameters and yield of wells. Analyze radial flow towards wells in confined and unconfined aquifers.
2. Creative design of wells and understand the construction practices. Analyze Interpret geophysical exploration data for scientific source finding of aquifers.
3. Evaluate the process of artificial recharge for increasing groundwater potential. Creative and effective measures for controlling saline water intrusion and apply appropriate measures for groundwater management.

UNITs	Descriptions	Hrs.	CO's
I	Occurrence and movement of ground water, aquifer and its types, classification of wells, steady and transient flow into partially, fully and non-penetrating and open wells,		CO1
II	Familiarization of various types of bore wells common in the state, design of open well, groundwater exploration techniques, methods of drilling of wells, percussion, rotary, reverse rotary, design of assembly and gravel pack, installation of well screen, completion and development of well		CO1,CO2
III	Groundwater hydraulics-determination of aquifer parameters by different method such as Theis, Jacob and Chow's, The is recovery method, well interference, multiple well systems, surface and subsurface exploitation and estimation of ground water potential, quality of ground water, artificial groundwater recharge planning, modeling, ground water project formulation.		CO2
IV	Pumping Systems: Water lifting devices; different types of pumping machinery, classification of pumps, component parts of centrifugal pumps; pump selection, installation and trouble-shooting; design of centrifugal pumps,		CO3
V	Pump performance curves, effect of speed on head capacity, power		CO3

	capacity and efficiency curves, effect of change of impeller dimensions on performance characteristics; Hydraulic ram, propeller pumps, mixed flow pumps and their performance characteristics; priming, self priming devices, roto-dynamic pumps for special purposes such as deep well turbine pump and submersible pump.		
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments:

1. Verification of Darcy's Law;
2. Study of different drilling equipments;
3. Sieve analysis for gravel and well screens design;
4. Estimation of specific yield and specific retention;
5. Drilling of a tube well;
6. Measurement of water level and drawdown in pumped wells;
7. Study of artificial ground water recharge structures

Text & Reference Book-

1. Ground water Hydrology, By: H.M. Raghunath
2. Wells and Pumps Engineering, By: S.D. Khepar and A.M. Michael
3. Pump: Theory & Practices, By: V.K. Jain
4. Irigation Theory and Practicals, By: A.M. Michael
5. Ground Water Engineering, By: D.K. Todd
6. Assessment of Ground Water Resources, By: Karanth

Modes of Evaluation and Rubric

Quiz, Assignment, Mid-term exam, End term exam and Practical Viva.
Rubric: End term exam. Practical: 50% Quiz and 50% Viva.

List/Links of e-learning resource

Recommendation by Board of studies on	14.12.2023
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Civil Engineering Department

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE

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Agricultural Engineering

Semester/Year		VI/III	Program		B.Tech.
Subject Category	DE-IV	Subject Code:	**AE-604(C)**	Subject Name:	**Machine design and Drawing**

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	-	-	-	100	3	1	-	4

Prerequisites:

This course is focused on design process of machine components and design of temporary and permanent type joints. Also this course gives an idea of CAD drawing and assembly drawing.

Course Objective:

Course Outcomes:

After completion of the course, students would be able to -

1. Illustrate various design consideration for machine component design
2. Judge failure modes and compute factor of safety
3. Design various joints subjected to static load indifferent working conditions
4. Analyse suitability of various joints
5. understand the concept of geometric modeling

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	2	1								
CO2	3	2	3	1								

CO3	3	3	3	1								
CO4	2	2	3	1								
CO5	2	3	2	1	2							

Contents:

UNITs	Descriptions	Hrs.	CO's
I	Basic Design concepts, design process, stages/phases in design, design considerations (strengths manufacturing, maintenance, environment, economics and safety): design for recycle and reuse, Design and safety factors for steady and variable loads, impact and fatigue considerations, Surface Finish, limits, fits and tolerance.	8	CO1 & CO2
II	Threaded Joints: Thread Nomenclature, Forms of Screw Threads, Designation of Indian Standard Thread, Designation of Bolts, Screws and Nuts, Common Screw Fasteners, representation of internal thread and external threads, Bolts Supporting Tensile Loads Only, static Stress in Screw Fastening, Eccentric Loading of Threaded Joints.	8	CO3 & CO4
III	Welded Joints**:** Representation of welds, strength of Welded Steel Joints, Design of Welded Joints for Static Loads, Strengths of Welds at Varying Loads, Initial Stress, Exercises Eccentric Loading of welded Joints.	8	CO3 & CO4
IV	Design of Cotter Joint and knuckle joint. Design of Keys and Coupling	8	CO3 & CO4
V	Basic fundamentals of CAD and Application of computer for design, CAD data exchange, Graphics standards, modes of graphics operation, Geometric Modeling. Types of mathematical representation of curves, parametric representation wire frame modeling	8	CO5
Guest Lectures (if any)			
Total Hours		40	

Suggestive list of experiments: (if any)

1. Prepare Orthographic views of given object
2. Prepare Isometric view of given object
3. Convert isometric view in orthographic views and vice versa
4. CAD initial setting commands-Snap, grid, Ortho, Osnap. Limits. Units, Object tracking. Opening, saving and closing a new and existing drawing/template
5. Identify various tools/commands for sketching.

6. Prepare 2D CAD drawing of given object
7. Identify various tools/commands for solid modelling
8. Prepare 3D parts of flange coupling
9. Prepare assembly of flange coupling
10. Prepare assembly of cotter joint
11. Prepare assembly of knuckle joint

Text Books-

1. Design of machine elements by V B. Bhandari Tata McGraw-Hill Education
2. Mechanical Engineering Design by Joseph Edward 'Shigley, McGraw-Hill
3. Machine Design by Robqrt. L., Norton
4. Design of Machine Elements: Volurrte, I by T. Krishña Rao, IK International
5. Machine Drawing by N. D. Bhatt.
6. CAD/CAM: Computer-Aided Design and Manufacturing Groover Pearson Education India

Reference Books-

1. Mechanical Design of Machine Elements and Machines by Jack A. Collins, Henry Busby, George Staab, Wiley
2. Machine Design by P.C. Sharma and D. K. Agarwal, S.K.Kataria & Sons.
3. Principles of Computer Graphics William M Neumann and Robert F.Sproul McGraw Hill Book Co. Singapore

Modes of Evaluation and Rubric

There will be continuous evaluation for during the semester for 40 sessional marks and 60 semester End term Marks. The practical marks are 50, out of which 30 marks will be awarded for viva voce and 20 marks for lab work. Out of 40 sessional marks, 20 shall be awarded for Mid semester, 20 marks to be awarded for day to day performance and Quiz/Assignments. For the 60 Marks, there will be a semester – End examination as per the norms of AICTE.

Recommendation by Board of studies on	Date:
Approval by Academic council on	Date:
Compiled and designed by	Name 1. Dr. Chandra Pal Singh
Checked and approved by	Name 1.