UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Lecture-wise Plan

Subject Name: Advanced Engineering Mathematics **Subject Code-SCE101**
Year: 1st Year **Semester: first**

Module Number	Topics	Number of Lectures (37)
1	**Statistic**:	**9L**
	Elements of statistic, frequency distribution; Concept of mean, median, mode and different types of distribution;Standard deviation and variance	4
	Curve fitting by least square method; Correlation and Regression, Testing of Hypothesis;Basic type of factorial design and Analysis of Variance	5
2	**Matrix operation**:	**5L**
	Matrix operation Eigen value and Eigen vector by iterative methods.	3
	Diagonalisation and square matrix.	2
3	**Numerical method**:,	**9L**
	Interpolation by Polynomial, Error analysis, Solution of system of linear equation by Gauss Seidaliterative method, Newton Raphson method	4
	Numerical Integration by Gauss quadrature	2
	Solution of ordinary differentialequation by Rayligh-Ritz method.	3
4	**Ordinary Differential Equation**: i) 2nd order homogeneous equation ii) Euler Cauchy's equation iii) Non homogeneous linear equation. **Partial differential equation**: i) Wave equation – one and two dimension ii) Heat equation- one dimension and two dimension.	**8L**
	Laplace transform, Fourier transform Fourier integral and their applications	**6L**

UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Advanced Structural Analysis **Subject Co**

Year: 1st Year Semester: First

Module Number	Topics	Number of Lectures
1.	Matrix Algebra – methods for matrix inversion and solution of simultaneous equations – band and sparse matrix technique stiffness and flexibility matrices of structural elements – various co-ordinate system and their transformation and synthesis matrix.	**8 L**
2.	Formulation of force and displacement methods – member approach. Finite element concept in Engineering Analysis – Displacement model shape functions and element properties. Analysis of plane stress/strain – axi-symmetric stress analysis.	**8 L**
3.	Weighted residual methods and variational formulation of Finite Element Analysis. Isoparametric element — Numerical integration – assemblage of elements. Solution techniques – Finite element programming – use of package programmes.	**9L**
Total Number Of Hours = 25		

Faculty In-Charge HOD, CE Dept.

UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Soil Structure Interaction **Subject Code-SCE 104**

Year: 1st Year Semester: First

Module Number	Topics	Number of Lectures
1.	General soil-structure interaction problems: Contact pressures and soil-structure interaction for shallow foundations, conceptof sub grade modulus, effects/parameters influencing subgrade modulus. Soil behavior, Foundation behavior, Interfacebehavior, Scope of soil foundation interaction analysis, soil response models, Winkler, Elastic continuum, Two parameterelastic models.	**8 L**
2.	Beam on Elastic Foundation: Soil Models: Infinite beam, Two parameters, Isotropic elastic half space, Analysis of beams offinite length, Classification of finite beams in relation to their stiffness.Plate on Elastic Medium: Thin and thick plates, Analysis of finite plates, Numerical analysis of finite plates, simplesolutions.	**8 L**
3.	Laterally Loaded Pile: Load deflection prediction for laterally loaded piles, Sub-grade reaction and elastic analysis,Interaction analysis.	**9L**
Total Number Of Hours = 25		

Faculty In-Charge HOD, CE Dept.

UNIVERSITY OF ENGINEERING AND MANAGEMENT,JAIPUR

Lecture-wise Plan

Subject Name: Repair And Rehabilitation Of Structures **Subject Code-SCE 105C**

Year: 1st Year Semester: First

Module Number	Topics	Number of Lectures
1.	Appraisal of damage and deterioration of structures by non-destructive and other techniques; Cause of deterioration.	**8 L**
2.	Environmental aspects and earthquake effects; Repair and strengthening of superstructure – structural components, loadbearing wall, panel walls; Strengthening of foundation; Grouting; Grout material, guniting, shotcreting, under pinning.	**8 L**
3.	Repair of steel structures – bridge, building, towers etc., monuments and historical structures. Prevention of water leakage instructures; Under-water repair; Durability of repairing material; Case histories.	**9L**
Total Number Of Hours = 25		

Faculty In-Charge HOD, CE Dept.

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR
Lab Manual

Title of Course: Structural Laboratory I
Course Code: SCE 191
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:
1. The students will develop a clear understanding of the various tests conducted on concrete in both fresh and hardened states.
2. They will develop the concepts of workability, slump test, Vee-bee compacting test and compaction factor tests which are conducted on fresh concrete to determine the fresh concrete properties.
3. The students will be able to perform mix design of concrete and as per the proportion develop concrete mixes of different compressive strengths.
4. The students will be able to perform and analyze the various properties of concrete in hardened state like compressive strength, Split Tensile Strength, Flexure Tests.
5. The students will be exposed to non-destructive testing like Rebound Hammer and Ultrasonic Pulse Velocity test.

Learning Outcomes: The students will be able to understand the various tests which are performed on cement like specific gravity, normal consistency, setting time. The students will also develop a clear understanding of the compressive strength on cement mortar cubes. The students will also develop a clear understanding of the various tests on fine aggregates like sieve analysis, fineness modulus, moisture content, bulk density. The students will also develop concepts on various tests conducted on coarse aggregate like fineness modulus, bulk density.

Course Contents:
Practicals that must be done in this course are listed below:

1. Tests on cement – specific gravity, fineness, soundness, normal consistency, setting time, compressive strength on cement mortar cubes.
2. Tests on fine aggregate – specific gravity, bulking, sieve analysis, fineness modules, moisture content, bulk density and deleterious materials.
3. Tests on coarse aggregate - specific gravity, sieve analysis, fineness modulus, bulk density.
4. Tests on Fresh Concrete: Workability: Slump, Vee-Bee, Compaction factor tests.
5. Hardened Concrete: Compressive strength on Cubes, Split tensile strength, Static modulus of elasticity, Flexure tests ,Non destructive testing (Rebound hammer & Ultrasonic pulse velocity).
6. Mix Design of Concrete.

Text Book:
1. Relevant latest IS codes on Aggregates, Cement & Concrete [269, 383, 2386, 10262(2009), SP23].
2. Laboratory manual of concrete testing by V.V. Sastry and M. L. Gambhir.

Experiment No. 1

Objective: To determine the normal consistency of a given sample of cement.

Apparatus: Vicat apparatus conforming to IS : 5513-1976, Balance, Gauging Trowel, Stop Watch, etc.

Theory: For finding out initial setting time, final setting time and soundness of cement, and strength a parameter known as standard consistency has to be used. The standard consistency of a cement paste is defined as that consistency which will permit a Vicat plunger having 10 mm diameter and 50 mm length to penetrate to a depth of 33-35 mm from the top of the mould.

Procedure :

1. The standard consistency of a cement paste is defined as that consistency which will permit the Vicat plunger to penetrate to a point 5 to 7 mm from the bottom of the Vicat mould

2. Initially a cement sample of about 300 g is taken in a tray and is mixed with a known percentage of water by weight of cement, say starting from 26% and then it is increased by every 2% until the normal consistency is achieved.

3. Prepare a paste of 300 g of Cement with a weighed quantity of potable or distilled water, taking care that the time of gauging is not less than 3 minutes, nor more than 5 min, and the gauging shall be completed before any sign of setting occurs. The gauging time shall be counted from the time of adding water to the dry cement until commencing to fill the mould.

4. Fill the Vicat mould (E) with this paste, the mould resting upon a non-porous plate. After completely filling the mould, smoothen the surface of the paste, making it level with the top of the mould. The mould may be slightly shaken to expel the air.

5. Place the test block in the mould, together with the non-porous resting plate, under the rod bearing the plunger; lower the plunger gently to touch the surface of the test block, and quickly release, allowing it to sink into the paste. This operation shall be carried out immediately after filling the mould.

6. Prepare trial pastes with varying percentages of water and test as described above until the amount of water necessary for making up the standard consistency as defined in Step 1 is found.

Experiment No 2

Objective: To determine the initial and final setting time of a given sample of cement.

Apparatus: Vicat apparatus conforming to IS : 5513-1976, Balance, Gauging Trowel, Stop Watch, etc

Theory : For convenience, initial setting time is regarded as the time elapsed between the moments that the water isadded to the cement, to the time that the paste starts losing its plasticity. The final setting time is the timeelapsed between the moment the water is added to the cement, and the time when the paste has completely lost its plasticity and has attained sufficient firmness to resist certain definite pressure

Procedure :

1. Preparation of Test Block - Prepare a neat 300 gms cement paste by gauging the cement with 0.85 times the water required to give a paste of standard consistency. Potable or distilled water shall be used in preparing the paste.

2. Start a stop-watch at the instant when water is added to the cement. Fill the Vicat mould with a cement paste gauged as above, the mould resting on a nonporous plate. Fill the mould completely and smooth off the surface of the paste making it level with the top of the mould.

3. Immediately after moulding, place the test block in the moist closet or moist room and allow it to remain there except when determinations of time of setting are being made.

4. Determination of Initial Setting Time - Place the test block confined in the mould and resting on the non-porous plate, under the rod bearing the needle (C); lower the needle gently until it comes in contact with the surface of the test block and quickly release, allowing it to penetrate into the test block

5. Repeat this procedure until the needle, when brought in contact with the test block and released as described above, fails to pierce the block beyond 5.0 ± 0.5 mm measured from the bottom of the mould shall be the initial setting time.

6. Determination of Final Setting Time - Replace the needle (C) of the Vicat apparatus by the needle with an annular attachment (F).

7. The cement shall be considered as finally set when, upon applying the needle gently

to the surface of the test block, the needle makes an impression thereon, while the attachment fails to do so.

8. The period elapsing between the time when water is added to the cement and the time at which the needle makes an impression on the surface of test block while the attachment fails to do so shall be the final setting time

Experiment No: 3

Objective: To determine the compressive strength sample of cement.

Apparatus : The standard sand to be used in the test shall conform to IS : 650-1966, Vibration Machine, Poking Rod, Cube Mould of 70.6 mm size conforming to IS : 10080-1982, Balance, Gauging Trowel, Stop Watch, Graduated Glass Cylinders, etc.

Theory : The compressive strength of hardened cement is the most important of all the properties. Therefore, it is not surprising that the cement is always tested for its strength at the laboratory before the cement is used in important works. Strength tests are not made on neat cement paste because of difficulties of excessive shrinkage and subsequent cracking of neat cement.

Procedure:

1. Preparation of test specimens - Clean appliances shall be used for mixing and the temperature of water and that of the test room at the time when the above operations are being performed shall be 27 ± 2°C. Potable/distilled water shall be used in preparing the cubes.

2. The material for each cube shall be mixed separately and the quantity of cement, standard sand and water shall be as follows:

Cement 200 g and Standard Sand 600 g

Water per cent of combined mass of cement and sand, where P is the percentage of water required to produce a paste of standard consistency determined as described in IS : 4031 (Part 4)-1988 or Experiment 1

3 .Place on a nonporous plate, a mixture of cement and standard sand. Mix it dry with a trowel for one minute and then with water until the mixture is of uniform colour. The quantity of water to be used shall be as specified in step 2. The time of mixing shall in any event be not less than 3 min and should the time taken to obtain a uniform colour exceed 4 min, the mixture shall be rejected and the operation repeated with a fresh quantity of cement, sand and water.

4. Place the assembled mould on the table of the vibration machine and hold it firmly in position by means of a suitable clamp.

6. Immediately after mixing the mortar in accordance with step 1 & 2, place the mortar in the cube mould and prod with the rod. Place the mortar in the hopper of the cube mould and prod again as specified for the first layer and then compact the mortar by vibration.

7. The period of vibration shall be two minutes at the specified speed of 12 000 ± 400 vibration per minute.

8. Curing Specimens - keep the filled moulds in moist closet or moist room for 24 ± 1 hour after completion of vibration. At the end of that period, remove them from the moulds and immediately submerge in clean fresh water and keep there until taken out just prior to breaking and shall be maintained at a temperature of 27 ± 2°C

9. Test three cubes for compressive strength for each period of curing mentioned under the relevant specifications (i.e. 3 days, 7 days, 28 days)

10. The cubes shall be tested on their sides without any packing between the cube and the steel plattens of the testing machine. One of the plattens shall be carried on a base and shall be self-adjusting, and the load shall be steadily and uniformly applied, starting from zero at a rate of 40N/mm2/min

Experiment No.4

Objective: To determine specific gravity of a given sample of fine aggregate.

Apparatus: Pycnometer, A 1 000-ml measuring cylinder, well-ventilated oven, Taping rod, Filter papers and funnel, etc.

Theory:

Procedure: 1. Sample of about 500 g shall be placed in the tray and covered with distilled water at a temperature of 22 to 32°C.. The sample shall remain immersed for 24 ± l/2 hours.

2. The water shall then be carefully drained from the sample. The saturated and surface-dry sample shall be weighed (weight A).

3. The aggregate shall then be placed in the pycnometer which shall be filled with distilled water. Any trapped air shall be eliminated by rotating the pycnometer on its side, the hole in the apex of the cone being covered with a finger. The pycnometer shall be dried on the outside and weighed (weight B).

4. The contents of the pycnometer shall be emptied into the tray, Thepycnometer shall be refilled with distilled water to the same level as 21 before, dried on the outside and weighed (weight C).

5. The water shall then be carefully drained from the sample. The sample shall be placed in the oven in the tray at a temperature of 100 to 110°C for 24 f l/2 hoursIt shall be cooled in the air-tight container and weighed (weight D).

Experiment No.5

Objective: To determine fineness modulus of fine aggregate and classifications based on IS: 383-1970

Apparatus : Test Sieves conforming to IS : 460-1962 Specification of 4.75 mm, 2.36 mm, 1.18 mm, 600 micron, 300micron, 150 micron, Balance, Gauging Trowel, Stop Watch, etc.

Theory: The sieve analysis is conducted to determine the particle size distribution in a sample of aggregate, which is known as gradation . The following limits used to classifie

Procedure:

1. The sample shall be brought to an air-dry condition before weighing and sieving. The air-dry sample shall be weighed and sieved successively on the appropriate sieves starting with the largest.

2. Material shall not be forced through the sieve by hand pressure. Lumps of fine material, if present, may be broken by gentle pressure with fingers against the side of the sieve.

3. Light brushing with a fine camel hair brush may be used on the 150-micron and 75-micron IS Sieves to prevent aggregation of powder and blinding of apertures.

4. On completion of sieving, the material retained on each sieve, together with any material cleaned from the mesh, shall be weighed.

Experiment No. 6

Objective: To determination of particle size distribution of coarse aggregates by sieving Apparatus : Test. Sieves conforming to IS : 460-1962 Specification of 80 mm, 40 mm20 mm, 10 mm, 4.75 mm, Balance, Gauging Trowel, Stop Watch, etc.

Theory: Grading refers to the determination of the particle-size distribution for aggregate. Grading limits and maximum aggregate size are specified because grading and size affect the amount of aggregate used as well as cement and water requirements, workability,

pumpability, and durability of concrete. In general, if the water-cement ratio is chosen correctly, a wide range in grading can be used without a major effect on strength. When gap-graded aggregate are specified, certain particle sizes of aggregate are omitted from the size continuum. Gap-graded aggregate are used to obtain uniform textures in exposed aggregate concrete.

Procedure:

1. The sample shall be brought to an air-dry condition before weighing and sieving. This may be achieved either by drying at room temperature or by heating at a temperature of 100‖ to 110°C. The air-dry sample shall be weighed and sieved successively on the appropriate sieves starting with the largest.

2. Material shall not be forced through the sieve by hand pressure.

3. On completion of sieving, the material retained on each sieve, together with any material cleaned from the mesh, shall be weighed.

Experiment No. 7

Objective: To determine crushing value of course aggregate .

Apparatus: A 15-cm diameter open-ended steel cylinder, with plunger and base-plate, of the general form and dimensions shown in Fig. ,A straight metal tamping rod, A balance of capacity 3 kg, readable and accurate to one gram, IS Sieves of sizes 12.5, 10 and 2.36 mm, For measuring the sample, cylindrical metal measure of sufficient rigidity to retain its form under rough usage and of the following internal dimensions: Diameter 11.5 cm and Height 18.0 cm .

Theory: The ‗aggregate crushing value' gives a relative measure of the resistance of an aggregate to crushing under a gradually applied compressive load. With aggregate of aggregate crushing value' 30 or higher, the result may be anomalous, and in such cases the‗ten percent fines value' should be determined instead.

Procedure :

1. The material for the standard test shall consist of aggregate passing a 12.5 mm IS Sieve and retained on a 10 mm IS Sieve, and shall be thoroughly separated on these sieves before testing.

2. The aggregate shall be tested in a surface-dry condition. If dried by heating, the period of drying shall not exceed four hours, the temperature shall be 100 to 110°C and th aggregate shall be cooled to room temperature before testing.

3. The appropriate quantity may be found conveniently by filling the cylindrical measure in three layers of approximately equal depth, each layer being tamped 25 times with the rounded end of the tamping rod and finally leveled off, using the tamping rod as a straight-edge.

4. The weight of material comprising the test sample shall be determined (Weight A) and the same weight of sample shall be taken for the repeat test.

5. The apparatus, with the test sample and plunger in position, shall then be placed between the platens of the testing machine and loaded at as uniform a rate as possible so that the total load is reached in 10 minutes. The total load shall be 400 kN.

6. The load shall be released and the whole of the material removed from the cylinder and sieved on a 2.36 mm IS Sieve for the standard test. The fraction passing the sieve shall be weighed (Weight B).

The aggregate crushing value should not be more than 45 per cent for aggregate used for concrete other than wearing surfaces, and 30 per cent for concrete used for wearing surfaces such a runways, roads and air pavements.

Experiment No. 8

Objective: To determine the impact value of course aggregate

Apparatus: An impact testing machine of the general form shown in Fig. 2 and complying with the following:

1. A cylindrical steel cup of internal dimensions: Diameter 102 mm, Depth 50 mm and not less than 6.3 mm thick

2. A metal hammer weighing 13.5 to 14.0 kg, the lower end of which shall be cylindrical in shape, 100.0 mm in diameter and 5 cm long, with a 2 mm chamfer at the lower edge, and case-hardened. The hammer shall slide freely between vertical guides so arranged that the lower (cylindrical) part of the hammer is above and concentric with the cup.

3. Means for raising the hammer and allowing it to fall freely between the vertical guides from a height of 380.0 mm on to the test sample in the cup, and means for adjusting the height of fall within 5 mm.

Sieves-The IS Sieves of sizes 12.5, 10 and 2.36 mm, Tamping Rod, balance of capacity not less than 500 g, Oven etc.

Theory: The aggregate impact value‘ gives a relative measure of the resistance of an aggregate to sudden shock or impact, which in some aggregates differs from its resistance to a slow compressive load.

Procedure :

1. The test sample shall consist of aggregate the whole of which passes a 12.5 mm IS Sieve and is retained on a 10 mm IS Sieve. The aggregate comprising the test sample shall be dried in an oven for a period of four hours at a temperature of 100 to 110°C and cooled.

2. The measure shall be filled about one-third full with the aggregate and tamped with 25 strokes of the rounded end of the tamping rod. The net weight of aggregate in the measure shall be determined to the nearest gram (Weight A)

3. The impact machine shall rest without wedging or packing upon the level plate, block or floor, so that it is rigid and the hammer guide columns are vertical.

4. The cup shall be fixed firmly in position on the base of the machine and the whole of the test sample placed in it and compacted by a single tamping of 25 strokes of the tamping rod.

5. The hammer shall be raised until its lower face is 380 mm above the upper surface of the aggregate in the cup, and allowed to fall freely on to the aggregate. The test sample shall be subjected to a total of 15 such blows each being delivered at an interval of not less than one second.

6. The crushed aggregate shall then be removed from the cup and the whole of it sieved on the 2.36 mm IS Sieve until no further significant amount passes in one minute. The fraction passing the sieve shall be weighed to an accuracy of 0.1 g (Weight. B).

7. The fraction retained on the sieve shall also be weighed (Weight C) and, if the total weight (C+B) is less than the initial weight (Weight A) by more than one gram, the result shall be discarded and a fresh test made. Two tests shall be made.

The aggregate impact value should not be more than 45 per cent for aggregate used for concrete other than for wearing surfaces, and 30 per cent for concrete used for wearing surfaces such a runways, roads and air field pavements

Experiment No. 9

Objective: To determine compressive strength of concrete cube specimen.

Apparatus:

Testing Machine - The testing machine may be of any reliable type, of sufficient capacity for the tests and capable of applying the load at the rate specified in 5.5

Cube Moulds - The mould shall be of 150 mm size conforming to IS: 10086-1982.

Cylinders -The cylindrical mould shall be of 150 mm diameter and 300 mm height conforming to IS: 10086-1982.

Weights and weighing device, Tools and containers for mixing, Tamper (square in cross section) etc.

Theory : Age at Test - Tests shall be made at recognized ages of the test specimens, the most usual being 7 and 28 days. Where it may be necessary to obtain the early strengths, tests may be made at the ages of 24 hours ± ½ hour and 72 hours ± 2 hours. The ages shall be calculated from the time of the addition of water to the 63 dry ingredients.

Number of Specimens - At least three specimens, preferably from different batches, shall be made for testing at each selected age.

Procedure :

1. Sampling of Materials - Samples of aggregates for each batch of concrete shall be of the desired grading and shall be in an air-dried condition. The cement samples, on arrival at the laboratory, shall be thoroughly mixed dry either by hand or in a suitable mixer in such a manner as to ensure the greatest possible blending and uniformity in the material.

2. Proportioning - The proportions of the materials, including water, in concrete mixes used for determining the suitability of the materials available, shall be similar in all respects to those to be employed in the work.

3. Weighing - The quantities of cement, each size of aggregate, and water for each batch shall be determined by weight, to an accuracy of 0.1 percent of the total weight of the batch.

4. Mixing Concrete - The concrete shall be mixed by hand, or preferably, in a laboratory batch mixer, in such a manner as to avoid loss of water or other materials. Each batch of concrete shall be of such a size as to leave about 10 percent excess after moulding the desired number of test specimens.

5. Mould - Test specimens cubical in shape shall be 15 × 15 × 15 cm. If the largest nominal size of the aggregate does not exceed 2 cm, 10 cm cubes may be used as an alternative. Cylindrical test specimens shall have a length equal to twice the diameter.

6. Compacting - The test specimens shall be made as soon as practicable after mixing, and in such a way as to produce full compaction of the concrete with neither segregation nor excessive laitance.

7. Curing - The test specimens shall be stored in a place, free from vibration, in moist air of at least 90 percent relative humidity and at a temperature of 27° ± 2°C for 24 hours ± ½ hour from the time of addition of water to the dry ingredients.

Placing the Specimen in the Testing Machine - The bearing surfaces of the testing machine shall be wiped clean and any loose sand or other material removed from the surfaces of the specimen

which are to be in contact with the compression platens

Conclusion / R :

i) The average 7 Days Compressive Strength of concrete sample is found to be …..…..

ii) The average 28 Days Compressive Strength of concrete sample is found to be …..…..

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Lab Manual

Title of Course: CAD Lab
Course Code: SCE 192
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:
1. The students will be able to develop the concepts of Computer Aided Design Of Structures.
2. They will be exposed to latest CAD CAM software environment and will be able to develop efficiently the detailed design and drawings including the floor plans of different kinds of structures.
3. The students will be able to prepare the detailed drawings of different structural elements including the ductility detailing of RCC slab, beam, column and footing design.

Learning Outcomes: The students will be able to develop the understanding of CAD software and develop a clear understanding of the analysis and design of a multistoried buildings using softwares. The students will be able to prepare the detailed drawings of different structural elements including the ductility detailing of RCC slab, beam, column and footing design.

Course Contents:
Exercises that must be done in this course are listed below:

1. Introduction and important features ofa software dealing with analysis and design of structures.
2. Analysis and design of a multistoried building using software, Preparation of detailed drawings of different structural elements including ductility detailing RCC Slab, beam, column and footing design.

Text Book:
1. CAD CAM Standard Manual.

INTRODUCTION to CAD

1. INTRODUCTION

Computer Aided Drafting is a process of preparing a drawing of an object on the screen of a computer. There are various types of drawings in different fields of engineering and sciences. In the fields of mechanical or aeronautical engineering, the drawings of machine components and the layouts of them are prepared. In the field of civil engineering, plans and layouts of the buildings are prepared. In the field of electrical engineering, the layouts of power distribution system are prepared. In all fields of engineering use of computer is made for drawing and drafting. The use of CAD process provides enhanced graphics capabilities which allows any designer to Conceptualize his ideas Modify the design very easily Perform animation Make design calculations Use colors, fonts and other aesthetic features.

The use of CAD process provides enhanced graphics capabilities which allows any designer to Conceptualize his ideas Modify the design very easily Perform animation Make design calculations Use colors, fonts and other aesthetic features.

REASONS FOR IMPLEMENTING A CAD SYSTEM

Increases the productivity of the designer:

CAD improves the productivity of the designer to visualize the product and its component, parts and reduces the time required in synthesizing, analyzing and documenting the design

Improves the quality of the design: CAD system improves the quality of the design. A CAD system permits a more detailed engineering analysis and a larger number of design alternatives can be investigated. The design errors are also reduced because of the greater accuracy provided by the system

Improves communication: It improves the communication in design. The use of a CAD system provides better engineering drawings, more standardization in the drawing, and better documentation of the design, few drawing errors and legibility.

Create data base for manufacturing:

In the process of creating the documentation for these products, much of the required data base to manufacture the products is also created.

Improves the efficiency of the design:

It improves the efficiency of the design process and the wastage at the design stage can be reduced.

APPLICATION OF CAD:

There are various processes which can be performed by use of computer in the drafting process.

1. Automated drafting: This involves the creation of hard copy engineering drawings directly from CAD data base. Drafting also includes features like automatic dimensioning, generation of cross – hatched areas, scaling of the drawing and the capability to develop sectional views and enlarged views in detail. It has ability to perform transformations of images and prepare 3D drawings like isometric views, perspective views etc.

2. , Geometric modeling: concerned with the computer compatible mathematical description of the geometry of an object. The mathematical description allows the image of an object to be displayed and manipulated on a graphics terminal through signals from the CPU of the CAD system. The software that provides geometric modeling capabilities must be designed for efficient use both by computer and the human designer.

BENEFITS OF CAD:

The implementation of the CAD system provides variety of benefits to the industries in design and production as given below:

1. Improved productivity in drafting

2. Shorter preparation time for drawing

3. Reduced man power requirement

4. Customer modifications in drawing are easier

5. More efficient operation in drafting

6. Low wastage in drafting

7. Minimized transcription errors in drawing

8. Improved accuracy of drawing

9. Assistance in preparation of documentation

10. Better designs can be evolved

11. Revisions are possible

12. Colors can be used to customize the product

13. Production of orthographic projections with dimensions and tolerances

14. Hatching of all sections with different filling patterns

15. Preparation of assembly or sub assembly drawings

16. Preparation of part list

17. Machining and tolerance symbols at the required surfaces

18. Hydraulic and pneumatic circuit diagrams with symbols

19. Printing can be done to any scale

LIMITATIONS OF CAD

1. 32 – bit word computer is necessary because of large amount of computer memory and time

2. The size of the software package is large

3. Skill and judgment are required to prepare the drawing

4. Huge investment

AUTO CAD

Auto CAD package is suitable for accurate and perfect drawings of engineering designs. The drawing of machine parts, isometric views and assembly drawings are possible in AutoCAD. The package is suitable for 2D and 3D drawings.

2. AutoCAD – BASICS

2.1 STARTING WITH ACAD CAD uses four basic elements for preparation of any drawing:

1. Line

2. Curves

3. Text

4. Filling point.

Computer Aided Drafting is done by the operator by placing the mouse pointer by placing the mouse pointer at the desired location and then executing the command to draw the graphic elements using different methods. Advanced computer aided drafting packages utilize four areas on the screen.

1. CURVES

Following are the various types of curves used in the drawings:

i. Circle

ii. Ellipse

iii. Arc

Regular or any other type.

Aim: to draw the following figure using ACAD

PROCEDURE

STEP 1:

Draw axis lines in the respective format with their intersection point at (0,0) Go to PROPERTIES tool bar Load line type as ISO LONG DASH SHORT DASH in the line type area. Select line type ISO LONG DASH SHORT DASH in the line type area.

STEP 2

a Draw circles of given dimensions using circle command with their centre as the intersection of the axis lines. 3 circles of diameters 94, 74 and 54 are to be drawn The circle with 74 diameter is of ISO LONG DASH SHORT DASH format

STEP 3: Draw two construction lines at an angle of 30o to the vertical axis line

STEP 4: With A as center an radius 100 draw an arc between the above lines

STEP 5: Offset the arc on the either side by the distances as mentioned in the figure.

STEP 6: Complete the figure by using fillet command.

STEP 7: Give dimensions to the completed figure. Command: _qsave

PRECAUTIONS:

Put ORTHO ON where ever necessary. Use the required modify tool bar commands like TRIM, ERASE, COPY, MIRROR ETC.

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Lab Manual

Civil Engineering Department

UNIVERSITY OF ENGINEERING AND MANAGEMENT, JAIPUR

Course Description

Title of Course: Seminar
Course Code: SCE181
L-T-P scheme: 0-2-0 **Course Credit: 1**

The overall aim of the seminar series is to help develop an emerging field at the intersection of multi-disciplinary understandings of culture and education. It will build on the existing body of work on education and culture, but its aim is explore and develop new perspectives in this area.
The objectives of the six exploratory seminars are:

- **to explore new research from a range of academic disciplines which sheds light on the questions outlined above**
- **to showcase cutting edge research on education and culture from outstanding academic researchers from the UK and internationally**
- **to bring together seminar participants from different disciplines such as Sociology, Philosophy, Psychology, Human Geography, Media Studies as well as Education and Cultural Studies**
- **to encourage and financially support the participation of PhD students**
- **to actively involve practitioners and users from each venue**
- **to engage a core group of policy makers**
- **to use the seminars to develop links between academics and stakeholders in the arts, library, media, community and educational sectors**