## MOHAMMED SATHAK A J COLLEGE OF ENGINEERING

Siruseri IT park, OMR, Chennai - 603103

| LESSON PLAN |  |  |  |
| ---: | :---: | ---: | ---: |
| Department of Mechanical Engineering |  |  |  |
| Name of the Subject | Engineering Graphics | Name of the <br> handling Faculty | Mr.Mohan S R |
| Subject Code | GE 3251 | Year / Sem | I/II |
| Acad Year | $2022-23$ | Batch | $2022-26$ |

## Course Objective

To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
To expose them to existing national standards related to technical drawings

## Course Outcome

CO1-Describe the fundamentals and standards of engineering graphics \& draw the basic geometrical constructions
CO2-Sketch orthographic projections of lines and plane surfaces.
CO3-Sketch the projections and solids and perform freehand sketching of simple solids
CO4-Construct the section and development of surfaces concept for simple solids
CO5- Construct the isometric and perspective projections of simple solids

| Lesson Plan |  |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| SI. No. | Topic(s) | T / R* |  | Mode of Teaching |  |  |  |
|  |  | Book | Required | (BB / PPT / NPTEL / MOOC / etc ) | L6) | CO | PO |

UNIT I PLANE CURVES AND FREEHAND SKETCHING

| 1 | BIS conventions and specifications - Size, layout and folding of drawing sheets | T1 | 1 | NPTEL | L1,L2 | CO1 | $\begin{gathered} \mathrm{PO1,} \mathrm{PO2,} \\ \text { PO12 } \\ \hline \end{gathered}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 2 | Basic Geometrical constructions, Curves used in engineering practices: | T1 | 1 | BB/NPTEL | L2 | CO1 | PO1, PO2 |
| 3 | Conics - Construction of ellipse, parabola and hyperbola | T1 | 1 | BB | L3 | CO1 | $\begin{aligned} & \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |
| 4 | Construction of cycloid | T1 | 2 | BB | L3 | CO1 | $\begin{array}{\|l\|} \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3, \mathrm{PO} 12 \\ \hline \end{array}$ |
| 5 | construction of involutes of square and circle | T1 | 1 | BB | L3 | CO1 | PO1, PO2, <br> PO3, PO12 |
| 6 | Tutorial | T1 \& R1 | 12 | - | L3 | CO1 | $\begin{array}{\|l} \hline \mathrm{PO}, \mathrm{PO} 2, \\ \mathrm{PO} 3, \mathrm{PO} 12 \end{array}$ |

[^0]Evaluation method
*based on answer sheets and direct interaction during Tutorials

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACE

| $\mathbf{7}$ | Orthographic projection- principles-Principal planes- <br> First angle projection-projection of points | T 1 | 1 | BB | $\mathbf{L 1 , L 2}$ | CO 2 | PO1, PO2, <br> PO12 |
| :---: | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{8}$ | Projection of straight lines (only First angle <br> projections) inclined to both the principal planes | T 1 | 2 | BB | $\mathbf{L 3}$ | CO 2 | $\mathrm{PO}, \mathrm{PO}$, <br> PO3 |


| $\mathbf{9}$ | Determination of true lengths and true inclinations by <br> rotating line method and traces Projection of planes <br> (polygonal and circular surfaces) inclined to both the <br> principal planes by rotating object method. | T 1 | 3 | BB | $\mathbf{L 3}$ | CO 2 <br> $\mathrm{PO}, \mathrm{PO} 2$, <br> PO3 |
| :---: | :--- | :---: | :---: | :---: | :---: | :---: |
| $\mathbf{1 0}$ | Tutorial | $\mathrm{T} 1 \& \mathrm{R} 1$ | 12 | - | $\mathbf{L 3}$ | CO 2 |

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any
*Tutorials / Assignment

Evaluation method
*based on answer sheets and direct interaction during Tutorials

UNIT III PROJECTION OF SOLIDS AND FREEHAND SKETCHING

| 11 | Projections of prisms, | T1 | 1 | BB | L2, L3 | CO3 | $\begin{aligned} & \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 12 | Projections of pyramids, | T1 | 1 | BB | L3 | CO3 | $\begin{aligned} & \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |
| 13 | Projections of cylinder, | T1 | 1 | BB | L3 | CO3 | $\begin{gathered} \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3 \end{gathered}$ |
| 14 | Projections of cone and | T1 | 1 | BB | L3 | CO3 | $\begin{gathered} \mathrm{PO} 1, \mathrm{PO} 2, \\ \text { PO3 } \end{gathered}$ |
| 15 | Projections of truncated solids | T1 | 1 | BB | L3 | CO 3 | $\begin{aligned} & \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |
| 16 | Visualization concepts and Free Hand sketching Layout of views \& multiple views from pictorial views of objects | T1 | 1 | BB | L1, L2, L3 | CO3 | $\begin{gathered} \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 12 \end{gathered}$ |
| 17 | Tutorial | T1 \& R1 | 12 | - | L3 | CO3 | $\begin{aligned} & \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any Developing

Evaluation method
*based on finishing of model design

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES

| 18 | Sectioning of solids - Prism | T1 | 1 | BB | L1, L2, L3 | CO4 | PO1, PO2, <br> PO3, PO12 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 19 | Pyramids | T1 | 1 | BB | L3 | CO4 | $\begin{gathered} \mathrm{PO1,PO2,} \\ \mathrm{PO} 3 \end{gathered}$ |
| 20 | Development of Prism | T1 | 1 | BB | L1, L2, L3 | CO4 | $\begin{array}{\|l\|} \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3, \mathrm{PO} 12 \\ \hline \end{array}$ |
| 21 | Pyramids | T1 | 2 | BB | L3 | CO4 | $\begin{array}{\|c\|} \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3 \end{array}$ |
| 22 | Tutorial | T1 \& R1 | 12 | - | L3 | CO4 | $\begin{aligned} & \mathrm{PO1,} \mathrm{PO2,} \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |

Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any
*Tutorials / Assignment

Evaluation method
*based on answer sheets and direct interaction during Tutorials

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

| 23 | Principles of isometric projection - isometric scale -Isometric projections of simple solids | T1 | 2 | BB | L1, L2, L3 | CO5 | $\begin{aligned} & \mathrm{PO} 1, \mathrm{PO} 2, \\ & \mathrm{PO} 3, \mathrm{PO} 12 \end{aligned}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 24 | truncated solids - Prisms, pyramids, cylinders, conescombination of two solid objects | T1 | 2 | BB | L3 | CO5 | $\begin{gathered} \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3 \end{gathered}$ |


| 25 | Perspective projection of simple solids |  |  |  |  | T1 |  | 2 | BB |  | L1,L2, L3 |  | CO5 | $\begin{array}{\|l\|} \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3, \mathrm{PO} 12 \end{array}$ |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 26 | Tutorial |  |  |  |  | T1 \& R1 |  | 12 | - |  | L3 |  | CO 5 | $\begin{array}{\|c\|} \hline \mathrm{PO} 1, \mathrm{PO} 2, \\ \mathrm{PO} 3 \end{array}$ |
| Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any *Tutorials / Assignment |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Evaluation method <br> *based on answer sheets and direct interaction during Tutorials |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Content Beyond the Syllabus Planned |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | Scale's |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Trapizoidal method |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Text Books |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | Natrajan K.V., -A text book of Engineering Graphicsll, Dhanalakshmi Publishers, Chennai, 2009. |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Venugopal K. and Prabhu Raja V., —Engineering Graphicsll, New Age International (P) Limited, 2008 |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Reference Books |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | Bhatt N.D. and Panchal V.M., -Engineering Drawingll, Charotar Publishing House, 50th Edition, 2010 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 2 | Basant Agarwal and Agarwal C.M., -Engineering Drawingll, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 3 | Gopalakrishna K.R., —Engineering Drawing\\| (Vol. I\&II combined), Subhas Stores, Bangalore, 2007 |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Website / URL References |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 1 | https://nptel.ac.in/courses/112/103/112103019/ |  |  |  |  |  |  |  |  |  |  |  |  |  |
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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Blooms Level |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Level 1 (L1) : Remembering |  |  |  |  | Lower <br> Order Thinking | Fixed <br> Hour <br> Exams | Level 4 (L4) : Analysing |  |  |  |  |  | Higher Order <br> Thinking | Projects Mini Projects |
| Level 2 (L2) : Understanding |  |  |  |  |  |  | Level 5 (L5) : Evaluating |  |  |  |  |  |  |  |
| Level 3 (L3) : Applying |  |  |  |  |  |  | Level 6 (L6) : Creating |  |  |  |  |  |  |  |
| Mapping syllabus with Bloom's Taxonomy LOT and HOT |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Unit No |  | Unit Name |  |  |  | L1 | L2 | L3 | L4 | L5 | L6 | LOT | HOT | Total |
| Unit 1 |  | PLANE CURVES |  |  |  | 1 | 2 | 4 |  |  |  | 7 | 0 | 7 |
| Unit 2 |  | PROJECTION OF POINTS, LINES AND PLANESURFACE |  |  |  | 1 | 1 | 3 |  |  |  | 5 | 0 | 5 |
| Unit 3 |  | PROJECTION OF SOLIDS \& FREE HAND SKETCH |  |  |  | 1 | 2 | 7 |  |  |  | 10 | 0 | 10 |
| $\text { Unit } 4$ |  | PROJECTION OF SECTIONED SOLIDS ANDDEVELOPMENT OF SURFACES |  |  |  | 2 | 2 | 5 |  |  |  | 9 | 0 | 9 |
| Unit 5 |  | ISOMETRIC AND PERSPECTIVE PROJECTIONS |  |  |  | 2 | 2 | 4 |  |  |  | 8 | 0 | 8 |
| Total |  |  |  |  |  | 7 | 9 | 23 | 0 | 0 | 0 | 39 | 0 | 39 |
| Total Percentage |  |  |  |  |  | 17.9487 | 23.0769 | 58.9744 | 0 | 0 | 0 | 100 | 0 | 100 |
| CO PO Mapping |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
| CO1 | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |
| CO2 | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |
| CO3 | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |
| CO4 | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |
| CO5 | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |
| Avg | 3 | 1 | 2 |  |  |  |  |  |  |  |  | 2 | 1 |  |

## Justification for CO-PO mapping

| CO1 | PO1: Apply the basic Maths to the problem to get solution strongly <br> PO2: Problems are related to Maths/Design modeling Lowerely <br> PO3: Problems are related to complex engineering and design system components moderately <br> PO12: Lifelong learning of engineering problems to the society moderately |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| CO2 | PO1: Apply the basic Maths to the problem to get solution strongly <br> PO2: Problems are related to Maths/Design modeling Lowerely PO3: Problems are related to complex engineering and design system components moderately PO12: Lifelong learning of engineering problems to the society moderately |  |  |  |  |
| CO3 | PO1: Apply the basic Maths to the problem to get solution strongly <br> PO2: Problems are related to Maths/Design modeling Lowerely <br> PO3: Problems are related to complex engineering and design system components moderately <br> PO12: Lifelong learning of engineering problems to the society moderately |  |  |  |  |
| CO4 | PO1: Apply the basic Maths to the problem to get solution strongly <br> PO2: Problems are related to Maths/Design modeling Lowerely <br> PO3: Problems are related to complex engineering and design system components moderately <br> PO12: Lifelong learning of engineering problems to the society moderately |  |  |  |  |
| CO5 | PO1: Apply the basic Maths to the problem to get solution strongly <br> PO2: Problems are related to Maths/Design modeling Lowerely <br> PO3: Problems are related to complex engineering and design system components moderately <br> PO12: Lifelong learning of engineering problems to the society moderately |  |  |  |  |
|  | 3 High level | 2 | Moderate level | 1 | Low level |
|  |  |  |  |  |  |
| Name \& Sign of Faculty Incharge : Mr.Mohan S R |  |  |  |  |  |
| Name \& Sign of Subject Expert : Mr.Mohan S R |  |  |  |  |  |
| Head of the Department : Dr.Shunmugasundaram M |  |  |  |  |  |


[^0]:    Suggested Activity: Assignment / Case Studies / Tuorials/ Quiz / Mini Projects / Model Developed/others Planned if any
    *Tutorials / Assignment

