



## Integral University, Lucknow

**Effective from Session: 2016-2017**

| Course Code       | DAR-301                                                                                                                                                                                                                                                                                                                    | Title of the Course | SURVEYING | L | 3 | T | 1 | P | 0 | C | - |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------|---|---|---|---|---|---|---|---|
| Year              | II                                                                                                                                                                                                                                                                                                                         | Semester            | III       |   |   |   |   |   |   |   |   |
| Pre-Requisite     |                                                                                                                                                                                                                                                                                                                            | Co-requisite        | NA        |   |   |   |   |   |   |   |   |
| Course Objectives | 1. The course focuses on the principles and techniques of land surveying, including chain and compass surveys, leveling, theodolite use, plane table methods, and error corrections, with an emphasis on accurate field measurements, area computations, and the interpretation of survey data for practical applications. |                     |           |   |   |   |   |   |   |   |   |

### Course Outcomes

| CO1 | Handle various survey instruments for a particular survey work.                    |
|-----|------------------------------------------------------------------------------------|
| CO2 | Carryout various Civil Engineering survey works.                                   |
| CO3 | Collect and analyses survey data for preparing drawings and maps.                  |
| CO4 | Apply checks for errors elimination.                                               |
| CO5 | To understand the principles, equipment, and methods of plane table surveying etc. |

| UnitNo.  | Title of the Unit         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Contact Hrs. | Mapped CO |
|----------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| UNIT-I   | Chain Survey              | Different kinds of chains, Principles of chain survey, Equipment and instruments. the field book, method of keeping the field book. Obstacles in chain survey, Correction of length and areas due to error in chain length from standard length. Computation of areas of regular figures. Computation of areas of irregular figures by means of formulas, Mean ordinate method, Trapezoidal rule, Simpson's rule, Area by means of planimeter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 8            | CO-1      |
| UNIT-II  | Compass Survey            | Prismatic compass, its use, whole circle bearings and reduced bearing. Magnetic variation, Local attraction and its elimination. Compass Traversing, Plotting, Closing error and its adjustment by graphical and other methods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8            | CO-2      |
| UNIT-III | Levelling                 | Purpose of levelling, concept of a level surface, horizontal surface, vertical surface, datum, reduced level and benchmarks. Principle and construction of dumpy, I.O.P. (tilting) levels. Concepts of line of collimation, axis of the bubble tube, axis of the telescope and vertical axis. Levelling staff (i) single piece (ii) folding Temporary adjustment: setting up and levelling, adjusting for parallax of Dumpy and I.O.P. level. Differential levelling, concept of back sight, fore sight, intermediate sight, station, change point, height of instrument. Level book and reduction of levels by (a) Height of collimation method and (b) Rise and fall method. Arithmetical checks. Problem on reduction of levels. Fly levelling, check levelling and profile levelling (L-section and X-section) Errors in levelling, and precautions to minimize them and permissible limits. Reciprocal levelling. Difficulties in levelling. | 12           | CO-3      |
| UNIT-IV  | Theodolite and Auto Level | The use of theodolite in taking horizontal and vertical angles. Interpretation of plans from architectural point of view. Working and application of Auto level from architectural point of view.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6            | CO-4      |
| UNIT-V   | Plane Table Survey        | Purpose of plane table surveying, Equipment used in plane table survey, centering, levelling and orientation of plane table. Methods of plane table surveying - Radiation, Intersection, Traversing, Resection, Two-point problem and three-point problems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 6            | CO-5      |

### References Books:

1. Surveying Vol:1 & 2: S.K. DUGGAL

### e-Learning Source:

1. <https://www.youtube.com/watch?v=Kp-2F0vLvAM&list=PLjtQ3BMex7hsqmg6WiEjzFacSpZ4YJBVL>

| PO-PSO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PO14 | PSO1 | PSO2 | PSO3 | PSO4 | PSO5 | PSO6 |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|
| CO     |     |     |     |     |     |     |     |     |     |      |      |      |      |      |      |      |      |      |      |      |
| CO1    | 1   | 2   | 2   | -   | -   | -   | 1   | -   | -   | 1    | -    | -    | -    | -    | 2    | -    | -    | -    | -    | 1    |
| CO2    | 1   | -   | 2   | -   | -   | -   | 1   | -   | -   | -    | -    | -    | -    | -    | -    | 2    | -    | -    | -    | -    |
| CO3    | 1   | 2   | -   | -   | -   | -   | 1   | -   | -   | 1    | -    | -    | -    | -    | -    | 2    | -    | -    | -    | -    |
| CO4    | 1   | 2   | -   | -   | -   | -   | 1   | -   | -   | 1    | -    | -    | -    | -    | -    | -    | -    | 2    | -    | -    |
| CO5    | 1   | 2   | 2   | -   | -   | -   | 1   | -   | -   | 1    | -    | -    | -    | -    | -    | -    | -    | 2    | -    | -    |

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

|                                    |                    |
|------------------------------------|--------------------|
| Name & Sign of Program Coordinator | Sign & Seal of HoD |
|------------------------------------|--------------------|



## Integral University, Lucknow

|                                          |                                                                              |                            |                            |          |          |          |          |
|------------------------------------------|------------------------------------------------------------------------------|----------------------------|----------------------------|----------|----------|----------|----------|
| <b>Effective from Session: 2016-2017</b> |                                                                              |                            |                            |          |          |          |          |
| <b>Course Code</b>                       | <b>DAR-302</b>                                                               | <b>Title of the Course</b> | <b>BUILDING SERVICES-I</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>                              | <b>II</b>                                                                    | <b>Semester</b>            | <b>III</b>                 | <b>3</b> | <b>1</b> | <b>-</b> | <b>-</b> |
| <b>Pre-Requisite</b>                     | <b>-</b>                                                                     | <b>Co-requisite</b>        | <b>-</b>                   |          |          |          |          |
| <b>Course Objectives</b>                 | Introduction to elementary building services of water supply and Sanitation. |                            |                            |          |          |          |          |

| <b>Course Outcomes</b> |                                                                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CO1</b>             | Familiarity with the sources, treatment methods, and distribution of water.                                                                           |
| <b>CO2</b>             | Understanding of pipes, fittings, and water supply systems.                                                                                           |
| <b>CO3</b>             | understanding of sanitation, sanitary fittings, fixtures and joints.                                                                                  |
| <b>CO4</b>             | Students will also be aware of simple drainage systems for small buildings, the incorporation of Electrical and Lighting Services in building design. |
| <b>CO5</b>             | Implementation of building services water supply & sanitation in design.                                                                              |

| <b>Unit No.</b> | <b>Title of the Unit</b>                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Contact Hrs.</b> | <b>Mapped CO</b> |
|-----------------|---------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| 1               | <b>Water supply &amp; Water quality, purification and treatment</b> | Water supply Hot and cold-water supply system, types and sizes; water supply fitting to bathrooms, Water closet, sinks, bathtubs, washbasins, bidets, showers, urinals etc.<br>Surface and ground water sources, quality/quantity, nature of impurities, treatments, water supply systems, sedimentation, water supply project. Sand filtration, sand filters, rapid sand filters, pressure filters, sterilization and disinfection.                                                                                                                  | 7                   | 2                |
| 2               | <b>Drainage</b>                                                     | Principles of drainage, material for drains, traps – their types, function and uses. Shapes and sizes of pipes for drainage system, sanitary fixture- W.C., Wash basins, bathtubs, sinks – their types, sizes, Septic tank – types, sizes etc. Simple exercises on preparation of layout plans for toilet, kitchen (both public and residential)                                                                                                                                                                                                      | 7                   | 3                |
| 3               | <b>Sewage</b>                                                       | Internal and external sewage, Basic principles of sanitation and disposals of waste matter from the building. Plumbing of buildings. Different system of plumbing of toilets in buildings. To prepare sanitary and water disposal schemes for waste water and surface drainage.<br>Planning of bathrooms and lavatory block in domestic, buildings, standard type of sanitary fittings and fixtures, Joints, Traps, Flushing cisterns, Manholes and septic tank, Intercepting Chambers/Inspection chambers and their location, Ventilation of sewers. | 9                   | 5                |
| 4               | <b>Lighting</b>                                                     | Different system of lighting-both natural and artificial, preparing and planning of electrical layout for different areas along with various communication equipment by symbolic representation selection of matching fittings for different work areas, matching light with site such as drawing room, bedroom, study: bath, kitchen etc., and public places like offices including basic knowledge of materials, finishes & maintenance, units for measuring lights.                                                                                | 9                   | 4                |
| 5               | <b>Electrical Services</b>                                          | House wiring, L & F points, Electrical and Mechanical Fixtures, Simple electrical layouts showing panels, Distribution boards, Consumer units, Circuit breakers, High Resistance Circuit (HRC) various types of switches, sockets, conduits. with detailed knowledge of various sizes and materials of wires.                                                                                                                                                                                                                                         | 8                   | 1                |

### References Books:

Modern Geotechnical Engg. By Alam Singh

Engineering Materials by R.K. Rajput

### e-Learning Source:

<https://youtu.be/2N2nITDSxFE?si=5kp1LMeoAXZPtMdx>

<https://youtu.be/zFUp3WvGvuM?si=wSilYu0I6JZndqDS>

| <b>PO-PSO CO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> | <b>PO8</b> | <b>PO9</b> | <b>PO10</b> | <b>PO11</b> | <b>PO12</b> | <b>PO13</b> | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> | <b>PSO4</b> |
|------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO1</b>       | -          | -          | -          | 3          | 2          | -          | 2          | -          | 1          | 1           | -           | 1           | 2           | -           | 2           | 1           | -           |
| <b>CO2</b>       | -          | -          | -          | 3          | 3          | -          | 2          | -          | 2          | -           | -           | -           | 2           | 3           | 2           | -           | -           |
| <b>CO3</b>       | -          | 2          | -          | -          | -          | 3          | 2          | -          | -          | 2           | -           | 1           | -           | -           | 2           | 3           | -           |
| <b>CO4</b>       | -          | -          | -          | -          | -          | -          | -          | -          | -          | -           | -           | -           | -           | -           | 2           | 1           | -           |
| <b>CO5</b>       | -          | -          | -          | -          | -          | -          | -          | -          | -          | -           | -           | -           | -           | -           | 2           | 3           | -           |

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

|                                               |                               |
|-----------------------------------------------|-------------------------------|
| <b>Name &amp; Sign of Program Coordinator</b> | <b>Sign &amp; Seal of HoD</b> |
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## Integral University, Lucknow

| Effective from Session: 2016-2017 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                     |                     |   |   |   |   |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------|---|---|---|---|
| Course Code                       | DAR 303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Title of the Course | DESIGN WITH CLIMATE | L | 3 | T | 1 |
| Year                              | 2 <sup>ND</sup> YEAR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Semester            | 3 <sup>RD</sup> SEM | P | 0 | C | - |
| Pre-Requisite                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Co-requisite        |                     |   |   |   |   |
| Course Objectives                 | <ul style="list-style-type: none"> <li>This subject area also known by the term building science in earlier times enlightens the students to the processes by which building and entire habitats can be designed to respond to nature, with climate as the basic parameter of design.</li> <li>Introduction to elementary principles of bioclimatic studies with respect to buildings and human comfort.</li> <li>Introduce principle of thermal comfort and its implication in design.</li> <li>Enable student to understand design strategies for different climatic regions.</li> <li>4. Familiarizing students with modern techniques to analyze climatic parameters and design buildings accordingly.</li> </ul> |                     |                     |   |   |   |   |

| Course Outcomes |                                                                                                                                                                                  |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CO1             | This subject enlightens the students to the processes by which building and entire habitats can be designed to respond to nature, with climate as the basic parameter of design. |
| CO2             | Enable students to understand design strategies for different climatic regions.                                                                                                  |
| CO3             | Also Familiarizing students with modern techniques to analyze climatic parameters and design buildings accordingly.                                                              |
| CO4             | Introduction to elementary principles of bioclimatic studies with respect to buildings and human comfort.                                                                        |
| CO5             | Introduction to Application of climatic principles for design of buildings in different climates.                                                                                |

| Unit No. | Title of the Unit | Contact Hrs. | Mapped CO |
|----------|-------------------|--------------|-----------|
| 1.       | Climate           | 10           | CO1       |
| 2.       | Indian climate    | 8            | CO2       |
| 3.       | Sun               | 7            | CO3       |
| 4.       | Devices           | 6            | CO4       |
| 5.       | Designing         | 9            | CO5       |

| References Books:                                                                                               |
|-----------------------------------------------------------------------------------------------------------------|
| Man, climate and architecture by baruch givoni                                                                  |
| Building Construction by W.B. Mackay Vol. I, II, III and IV                                                     |
| e-Learning Source:                                                                                              |
| <a href="https://youtu.be/VKBvoepdPRY?feature=shared">https://youtu.be/VKBvoepdPRY?feature=shared</a>           |
| <a href="https://youtu.be/6BeP37WY8bA?si=Lz3gIXffaET5a8fW">https://youtu.be/6BeP37WY8bA?si=Lz3gIXffaET5a8fW</a> |

| PO-PSO | PO  |     |     |     |     |     |     |     |     |      |      |      |      | PSO  |      |      |      |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| CO     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PSO1 | PSO2 | PSO3 | PSO4 |
| CO1    | 1   | -   | -   | -   | 3   | -   | -   | -   | -   | -    | -    | -    | 2    | -    | 1    | 3    | -    |
| CO2    | -   | -   | -   | -   | 3   | -   | 2   | -   | -   | -    | -    | -    | 3    | -    | 2    | 3    | -    |
| CO3    | -   | -   | -   | -   | 3   | -   | 2   | -   | -   | 1    | -    | -    | 2    | -    | 2    | 3    | -    |
| CO4    | -   | -   | -   | 2   | 3   | -   | -   | -   | -   | -    | -    | -    | 3    | -    | 1    | 3    | -    |
| CO5    | -   | 2   | -   | -   | 2   | -   | -   | -   | -   | 3    | -    | -    | 1    | -    | 1    | 3    | -    |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

|                                    |                    |
|------------------------------------|--------------------|
| Name & Sign of Program Coordinator | Sign & Seal of HoD |
|------------------------------------|--------------------|



## Integral University, Lucknow

| Effective from Session: -2016-2017 |                                                                                                                                                                                                                                                                                                                              |                     |                         |    |    |      |   |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------------|----|----|------|---|
| Course Code                        | DAR-304                                                                                                                                                                                                                                                                                                                      | Title of the Course | ARCHITECTURE GRAPHICS-I | L  | T  | P/ST | C |
| Year                               | II                                                                                                                                                                                                                                                                                                                           | Semester            | III                     | 02 | 00 | 03   | - |
| Pre-Requisite                      | NONE                                                                                                                                                                                                                                                                                                                         | Co-requisite        | NONE                    |    |    |      |   |
| Course Objectives                  | <ul style="list-style-type: none"><li>Architectural Graphics focuses on the techniques, methodologies, and graphic tools used in visualizing, creating and conveying architectural ideas and concepts.</li><li>The subject focuses on to develop perception and presentation of architectural forms and buildings.</li></ul> |                     |                         |    |    |      |   |

| <b>Course Outcomes</b> |                                                                                                                                                     |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CO1</b>             | Architectural Graphics focuses on the techniques, methodologies, and graphic tools used in visualizing, creating and conveying architectural ideas. |
| <b>CO2</b>             | Explains the different basic fundamentals like elements, principle and etc. that builds the very foundation of an Architecture design.              |
| <b>CO3</b>             | It focuses on to develop the perception and presentation of architectural forms and buildings.                                                      |
| <b>CO4</b>             | Introduces the concept and skills of presentation of any Architecture design.                                                                       |
| <b>CO5</b>             | It develops students' ability in freehand sketching as a fundamental skill for quick visualization and communication of architectural ideas.        |

| <b>Unit No.</b> | <b>Title of the Unit</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Contact Hrs.</b> | <b>Mapped CO</b> |
|-----------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------|
| 1               | <b>Basic design</b>        | General design principles evolving out of objects of daily use, Utility, structural stability and beauty requirements of various industrial and utilitarian objects. Basic concepts of preparing architectural drawing involving house hold furniture's for Drawing, Dining & Bed rooms, studio stools, tables.                                                                                                                                                                                                                                                   | 12                  | 1                |
| 2               | <b>Drawing Techniques</b>  | Drawing a line. Different types, characteristics of lines. Application of all types of lines in architectural drawings. Presentation using other presentation techniques (water colours, crayons, Pastels etc.)                                                                                                                                                                                                                                                                                                                                                   | 07                  | 3                |
| 3               | <b>Rendering</b>           | Rendering techniques in colour & ink in order to develop the skills of presentation and to visualize forms in space. (a) The drawing of sketch which is supplied to be rendered in colour, pencil and ink with emphasis on shades and shadows in same size or after enlarging/reducing. (b) Arrangement of geometrical forms within the given space area and finishes in colours or colour tints. (c) Stippling in ink to create effects of 3 dimensions and shadows etc. (Geometrical forms which is to be involved are square, rectangle, circle and triangle.) | 09                  | 2                |
| 4               | <b>Perspective Drawing</b> | Principles of perspective drawing and understanding of all relevant terms, drawing perspective views by one point and two-point perspective methods, Perspective by measuring point method, Perspective views of interior designs by projection / measuring point method.                                                                                                                                                                                                                                                                                         | 06                  | 4                |
| 5               | <b>Free Hand Sketching</b> | Importance of free hand sketching in architectural drawings, Introduction of various mediums used for presentations.                                                                                                                                                                                                                                                                                                                                                                                                                                              | 06                  | 5                |

|                                                                                                                                                                         |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>References Books:</b>                                                                                                                                                |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ching, Francis D. K., Architectural Graphics.                                                                                                                           |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Gill, Robert W., Rendering with Pen & Ink.                                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>e-Learning Source:</b>                                                                                                                                               |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Fundamentals of Architectural Drawing and Sketching ( <a href="https://youtu.be/wg7yT3mmCNk?si=c-mjUW3wT-nekwCr">https://youtu.be/wg7yT3mmCNk?si=c-mjUW3wT-nekwCr</a> ) |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| <b>PO-PSO</b> | <b>PO1</b> | <b>PO2</b> | <b>PO3</b> | <b>PO4</b> | <b>PO5</b> | <b>PO6</b> | <b>PO7</b> | <b>PO8</b> | <b>PO9</b> | <b>PO10</b> | <b>PO11</b> | <b>PO12</b> | <b>PO13</b> | <b>PSO1</b> | <b>PSO2</b> | <b>PSO3</b> |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>CO</b>     |            |            |            |            |            |            |            |            |            |             |             |             |             |             |             |             |
| <b>CO1</b>    | -          | 2          | -          | -          | -          | 3          | -          | -          | -          | -           | -           | -           | -           | -           | 2           | -           |
| <b>CO2</b>    | -          | 3          | -          | 1          | -          | 3          | -          | -          | -          | -           | -           | -           | -           | -           | 2           | -           |
| <b>CO3</b>    | -          | -          | -          | -          | -          | 3          | -          | -          | -          | -           | -           | -           | -           | -           | 2           | -           |
| <b>CO4</b>    | -          | -          | -          | -          | -          | 3          | -          | -          | -          | -           | -           | -           | -           | -           | 3           | -           |
| <b>CO5</b>    | -          | 1          | -          | -          | -          | 3          | -          | -          | -          | -           | -           | -           | -           | -           | 1           | -           |

**1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation**

|                                               |                               |
|-----------------------------------------------|-------------------------------|
| <b>Name &amp; Sign of Program Coordinator</b> | <b>Sign &amp; Seal of HoD</b> |
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## Integral University, Lucknow

Effective from Session: 2016-2017

| Course Code       | DAR-305                                                                                                                                                                                                                                  | Title of the Course | STRENGTH OF MATERIAL | L | 03 | T | 01 | P | 00 | C |  |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|----------------------|---|----|---|----|---|----|---|--|
| Year              | II                                                                                                                                                                                                                                       | Semester            | III                  |   |    |   |    |   |    |   |  |
| Pre-Requisite     | None                                                                                                                                                                                                                                     | Co-requisite        | NA                   |   |    |   |    |   |    |   |  |
| Course Objectives | The objective of the present course is to make the students acquainted with the concept of load resultant, consequences and how different kinds of loadings can be withstood by different kinds of members with some specific materials. |                     |                      |   |    |   |    |   |    |   |  |

| Course Outcomes |                                                                                                                                                    |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| CO1             | Analyze indeterminate structures like fixed and continuous beams of simple structures.                                                             |
| CO2             | Analyze shear force and bending moments for different types of beams.                                                                              |
| CO3             | Study of different types of stresses and their variation along the length of beam.                                                                 |
| CO4             | To analyze and understand principal stresses due to the combination of two-dimensional stresses on an element and failure mechanisms in materials. |
| CO5             | To evaluate the behavior of torsional members, columns and struts.                                                                                 |

| Unit No. | Title of the Unit                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Contact Hrs. | Mapped CO |
|----------|------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| 1        | <b>Principal Stress and Principal Planes. Bending Moment and Shear Force</b> | Principal stress and principal plane under direct and shear stress. Graphical determination by Mohr's circle method. Concept of a beam, and supports (Hinged, Roller and Fixed). Types of Beams: Simply supported, cantilever, fixed, overhang and continuous beams. Types of loads (distributed, point and varying). Concept of Bending Moment & Shear Force. Sign conventions. Bending moment and shear force diagrams for cantilever, simply supported and overhanging beams subjected to uniformly distributed, concentrated and uniformly varying loads. Relationship between load, shear force and bending moment. Point of maximum B.M. and contraflexure, concept of fixed and continuous beams.                                                                                                                  | 10           | CO1       |
| 2        | <b>Bending and Shear Stresses Combined Direct &amp; Bending Stresses:</b>    | Assumption of theory of simple bending. Derivation of the equation. $M/I = F/Y = E/R$ . Concept of centroid and second moment of area, Radius of gyration, Theorems of parallel and perpendicular axes, Second Moment of area for sections: rectangle, triangle, circle, trapezium, angle, Tee, I, Channel and compound sections. Moment of resistance, section modulus and permissible bending stresses, Bending stresses in circular rectangular, I, T and L section. Comparison of strength of the above sections. Concept of shear stresses in beams, Shear stress distribution in rectangular, I and T section. Concentric and eccentric loads, eccentricity, effect of eccentric load on the section, middle third rule; Stresses due to eccentric loads. Examples in the case of short columns, chimneys and dams. | 10           | CO2       |
| 3        | <b>Torsion</b>                                                               | Definition of torque and angle of twist. Derivation of torsion equation. Polar moment of inertia. Strength of hollow and solid shaft, advantage of a hollow shaft over a solid shaft. Comparison of weights of solid and hollow shafts for same strength. Horsepower transmitted. Calculation of shaft diameter for a given Horsepower.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8            | CO3       |
| 4        | <b>Fixed and Continuous Beam</b>                                             | Fixed and Continuous Beam: Effect of fixing and continuity, fixed beams with point loads and U.D. Load. Continuous beam of uniform section covering three spans with free ends (supports being at the same level) B.M. & S.F. Diagram. Points of Contraflexure of fixed and continuous beams.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 8            | CO4       |
| 5        | <b>Column and struts</b>                                                     | Columns & Struts: Definition of long column, short column and strut, slenderness ratio, equivalent length, critical load, collapse load, End conditions of column. Application of Euler's and Rankine's formula (no derivation), simple numerical problems based on Euler's and Rankine's formulae.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6            | CO5       |

### References Books:

1. "Strength of Materials – R.K. Rajput
2. "Strength of Materials –Dr. R.K. Bansal

### e-Learning Source:

1. <https://archive.nptel.ac.in/courses/105/105/105105108/>

| PO-<br>PSO<br>CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1              | 3   | 3   | -   | 3   | -   | -   | -   | -   | -   | 2    | 1    | 3    | 3    | 1    |
| CO2              | 3   | 2   | 2   | -   | -   | -   | -   | -   | -   | 2    | -    | 3    | 3    | 1    |
| CO3              | 3   | 3   | 2   | -   | -   | -   | -   | -   | -   | 2    | -    | 2    | 3    | 1    |
| CO4              | 2   | 2   | 2   | -   | -   | -   | -   | -   | -   | 4    | -    | 3    | 3    | 2    |
| CO5              | 3   | 1   | -   | -   | -   | -   | -   | -   | -   | 3    | 1    | 3    | 3    | 1    |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

|                                    |                    |
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| Name & Sign of Program Coordinator | Sign & Seal of HoD |
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## Integral University, Lucknow

| Effective from Session: |                                                                                                                                                                                                                                                                                                                                                                            |                     |                       |   |   |      |    |
|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-----------------------|---|---|------|----|
| Course Code             | DAR 306                                                                                                                                                                                                                                                                                                                                                                    | Title of the Course | ARCHITECTURE DESIGN-I | L | T | P/ST | C  |
| Year                    | 2 <sup>ND</sup> YEAR                                                                                                                                                                                                                                                                                                                                                       | Semester            | 3 <sup>RD</sup> SEM   | 1 | 0 | 5    | 60 |
| Pre-Requisite           |                                                                                                                                                                                                                                                                                                                                                                            | Co-requisite        |                       |   |   |      |    |
| Course Objectives       | 1.The course aims at developing the requisite level of proficiency in Drawing, which is seen as a primary communication tool in the practice of architecture just like language.<br>2.Familiarization with drafting tools and accessories.<br>3.Implication of knowledge of design fundamentals and knowledge gained in other subjects to develop better design solutions. |                     |                       |   |   |      |    |

| Course Outcomes |                                                                                                                                                                                                                                                                                                                                              |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CO1</b>      | Students will be able to apply anthropometric principles and analyze human activities to determine functional spatial requirements in architectural design.<br>Exercises and site observations help students relate human dimensions and movements to the design of interior and exterior spaces.                                            |
| <b>CO2</b>      | Students will be able to visualize, conceptualize, and design small functional structures, demonstrating understanding of form, texture, material, and color.<br>Workshop sessions, site visits, and design exercises enhance creative and manual skills through experimentation with materials and natural elements.                        |
| <b>CO3</b>      | Students will be able to analyze and interpret design elements and concepts such as space, form, mass, and volume, and apply them in creating meaningful design compositions.<br>Design problems and conceptual sketches develop perception and spatial understanding.                                                                       |
| <b>CO4</b>      | Students will be able to translate 2D ideas into 3D physical forms through model-making, demonstrating spatial clarity, proportions, and scale.<br>Hands-on model making workshops foster creativity, craftsmanship, and visualization of spatial relationships.                                                                             |
| <b>CO5</b>      | Students will be able to observe, record, and represent built spaces accurately through measured drawings, sketches, and photographs, enhancing their visual communication skills.<br>Site visits, Educational tours, on-site sketching, and photographic documentation help students understand real architectural details and proportions. |

| Unit No. | Title of the Unit  |                                                                                                                                                                                                                                                                                                                                                                                    | Contact Hrs. | Mapped CO |
|----------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| UNIT-I   | Design parameter   | Exercises to understand the Parameters of design: Anthropometrics, human activity and the use of spaces.                                                                                                                                                                                                                                                                           | 10           | CO1       |
| UNIT-II  | Design             | Workshop course designed to train the students to visualize in space and to develop his sensitivity to form structure, spaces, texture and colour, Development of manual dexterity with construction experiments employing different materials, Design of small simple structures like bus stop, shop fronts, gate etc. use of natural elements (air,water etc.) in a given space. | 8            | CO2       |
| UNIT-III | Elements & concept | Problems related to the understanding of the elements of architectural design, concepts of space and form and their perception.                                                                                                                                                                                                                                                    | 7            | CO3       |
| UNIT-IV  | Model              | Block models to explain 3-D-effects be got prepared from the students for which the tools & materials etc. will be supplied from the institution.                                                                                                                                                                                                                                  | 6            | CO4       |
| UNIT-V   | Drawings           | Study of a given space through elementary measured drawings, sketching and Photography.                                                                                                                                                                                                                                                                                            | 9            | CO5       |

### References Books:

Robert W.Gill Rendering with Pen and Ink

### e-Learning Source:

<https://youtu.be/CpmEqB0BY2g?si=3xLWJYnfSY1I8u48>

<https://youtu.be/n1W0JMublaE?si=7JyoVF7tDj4TCfi8>

**NOTE** – Site visits, case studies may involve local/out station study/Educational Tours. And shall have weightage in course work marks to be decided by subject teacher.

One model of design in detail be got prepared from the students for which the materials etc.shall be supplied from the institution.



## Integral University, Lucknow

| PO-PSO | PO  |     |     |     |     |     |     |     |     |      |      |      |      | PSO  |      |      |      |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|
| CO     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PSO1 | PSO2 | PSO3 | PSO4 |
| CO1    | -   | 3   | -   | -   | -   | -   | 1   | -   | -   | -    | -    | -    | -    |      |      |      |      |
| CO2    | -   | 2   | -   | -   | 2   | -   | 1   | -   | -   | -    | -    | -    | -    |      |      |      |      |
| CO3    | -   | 3   | -   | -   | -   | 3   | -   | -   | -   | -    | -    | -    | -    |      |      |      |      |
| CO4    | -   | 2   | -   | 1   | -   | -   | 1   | -   | -   | -    | -    | -    | -    |      |      |      |      |
| CO5    | -   | -   | 3   | -   | 3   | -   | 2   | -   | -   | -    | -    | -    | -    |      |      |      |      |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

|                                    |                    |
|------------------------------------|--------------------|
| Name & Sign of Program Coordinator | Sign & Seal of HoD |
|------------------------------------|--------------------|



## Integral University, Lucknow

Effective from Session: 2016-2017

|                          |                                                                                                                                                     |                            |                   |          |          |          |          |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------|----------|----------|----------|----------|
| <b>Course Code</b>       | <b>DAR-351</b>                                                                                                                                      | <b>Title of the Course</b> | <b>Survey Lab</b> | <b>L</b> | <b>T</b> | <b>P</b> | <b>C</b> |
| <b>Year</b>              | II                                                                                                                                                  | <b>Semester</b>            | III               | <b>0</b> | <b>0</b> | <b>3</b> | <b>-</b> |
| <b>Pre-Requisite</b>     | -                                                                                                                                                   | <b>Co-requisite</b>        | NA                |          |          |          |          |
| <b>Course Objectives</b> | The objective of the Survey Lab is to equip students with practical skills and knowledge in the use of modern surveying instruments and techniques. |                            |                   |          |          |          |          |

### Course Outcomes

|            |                                                                         |
|------------|-------------------------------------------------------------------------|
| <b>CO1</b> | Identify the different instruments for linear measurement.              |
| <b>CO2</b> | Identify the different instruments for angular measurement.             |
| <b>CO3</b> | Identify the different instruments for levelling.                       |
| <b>CO4</b> | Record and observing necessary observation with the survey instruments. |

| Unit No.  | Title of the Unit                                                                                                                                                         | Contact Hrs. | Mapped CO |
|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| <b>1</b>  | <b>Chain Surveying</b><br>Experiment No.1 (a) Ranging a line. (b) Chaining a line and recording in the field book. (c) Testing and adjustment of chain.                   | 3            | CO1       |
| <b>2</b>  | Experiment No.2 (a) Chaining of a line involving reciprocal ranging. (b) Taking offsets and setting out right angles with cross staff and Indian optical square.          | 3            | CO1       |
| <b>3</b>  | Experiment No.3 (a) Chain survey of a small area. Plate I.(b) Chaining a line involving obstacles in ranging.                                                             | 3            | CO1       |
| <b>4</b>  | Experiment No.4 <b>Compass Survey</b><br>(a) Setting the compass and taking observations. (b) Measuring angles between the lines meeting at a point by prismatic compass. | 3            | CO2       |
| <b>5</b>  | Experiment No.5 Traversing with the prismatic compass and chain of a closed traverse. (recording and plotting by included angles)                                         | 3            | CO2       |
| <b>6</b>  | Experiment No.6 Determination of local attraction at a station by taking fore and back bearing.                                                                           | 3            | CO3       |
| <b>7</b>  | Experiment No.7 To find true bearing of a line at a place.                                                                                                                | 3            | CO3       |
| <b>8</b>  | Experiment No.8 <b>Levelling:</b><br>To find the difference of level between two distant points by taking staff readings on different stations from the single setting.   | 3            | CO3       |
| <b>9</b>  | Experiment No.9 To find the difference of level between two points by taking at least four change points.                                                                 | 3            | CO4       |
| <b>10</b> | Experiment No.10 Longitudinal sectioning of a road.                                                                                                                       | 3            | CO4       |

### References Books:

1. Lab Manual

### e-Learning Source:

1.

| PO-PSO<br>CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PSO1 | PSO2 | PSO3 |
|--------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| <b>CO1</b>   |     |     |     | 3   |     | 2   |     |     |     | 3    |      | 2    |      |      |      |      |
| <b>CO2</b>   |     |     |     | 3   |     | 2   |     |     |     | 3    |      | 2    |      | 1    |      | 2    |
| <b>CO3</b>   |     |     |     | 3   |     | 2   |     |     |     | 3    |      | 2    |      |      | 2    |      |
| <b>CO4</b>   |     |     |     | 3   |     | 2   |     |     |     | 3    |      | 2    |      | 2    |      | 3    |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

|                                               |                               |
|-----------------------------------------------|-------------------------------|
| <b>Name &amp; Sign of Program Coordinator</b> | <b>Sign &amp; Seal of HoD</b> |
|-----------------------------------------------|-------------------------------|



## Integral University, Lucknow

Effective from Session: 2016-2017

|                          |                                                                                                                                                                                                                                                                                                                                                                                                                           |                            |                       |          |          |             |          |
|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|----------|----------|-------------|----------|
| <b>Course Code</b>       | <b>DAR-356</b>                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Title of the Course</b> | <b>MODEL WORKSHOP</b> | <b>L</b> | <b>T</b> | <b>ST/P</b> | <b>C</b> |
| <b>Year</b>              | II                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>Semester</b>            | III                   | <b>0</b> | <b>0</b> | <b>3</b>    | <b>-</b> |
| <b>Pre-Requisite</b>     |                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Co-requisite</b>        | NA                    |          |          |             |          |
| <b>Course Objectives</b> | <ul style="list-style-type: none"> <li>To introduce students to the fundamentals of model making, including the use of various materials, tools, and equipment.</li> <li>To develop skills in creating basic geometric and architectural forms with appropriate scale and dimensions.</li> <li>To encourage the practical application of model-making skills by constructing a complete built structure model.</li> </ul> |                            |                       |          |          |             |          |

| Course Outcomes |                                                                                                                                                        |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CO1</b>      | Student will be able to handle various material, adhesives for model making.                                                                           |
| <b>CO2</b>      | They will also be able to learn use of different types of colors.                                                                                      |
| <b>CO3</b>      | They will learn to differentiate between different types of models like site models, block models and finished presentation models.                    |
| <b>CO4</b>      | Students will be able to select and apply appropriate scales for different types of models, ensuring accurate representation of architectural designs. |
| <b>CO5</b>      | Students will design and construct a complete built structure model, showcasing their understanding of materials, techniques, and presentation skills. |

| Unit No. | Title of the Unit                                                  |                                                                                                                                                                                                             | Contact Hrs. | Mapped CO |
|----------|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|
| 1        | <b>Introduction to various materials used for model making:</b>    | Experiments with various materials and equipment in terms of preparation of basic forms / geometrical forms with appropriate scale and dimensions.                                                          | 3            | CO1       |
| 2        | <b>Use of instruments and adhesives required for model making:</b> | Use of various instruments required for model making. Use of various adhesives and joining techniques.                                                                                                      | 3            | CO1       |
| 3        | <b>Use of colors in model making:</b>                              | Appropriate use of colors in model making, its importance and methods of coloring the models.                                                                                                               | 3            | CO2       |
| 4        | <b>Types of models:</b>                                            | Introduction to various types of models such as site model, study model, block model and finished presentation models. Importance of various types of models to appropriate stages of Architectural Design. | 3            | CO3       |
| 5        | <b>Scales in model making:</b>                                     | Use of appropriate scales, suitable to various types of models.                                                                                                                                             | 3            | CO4       |
| 6        | <b>Model of a built structure:</b>                                 | Study and preparation of model of a complete built structure.                                                                                                                                               | 3            | CO5       |

**References Books:**

1. Lab Manual

**e-Learning Source:**

1.

| PO-PSO-<br>CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | PSO1 | PSO2 | PSO3 |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|
| <b>CO1</b>    | 2   | -   | -   | -   | -   | 3   | -   | -   | -   | -    | -    | -    | -    | -    | -    | 1    |
| <b>CO2</b>    | -   | -   | -   | -   | -   | 3   | -   | -   | -   | -    | -    | -    | -    | -    | -    | -    |
| <b>CO3</b>    | -   | 3   | -   | -   | -   | 2   | -   | 1   | -   | -    | -    | -    | -    | -    | 1    | 2    |
| <b>CO4</b>    | 1   | 3   | -   | -   | -   | 3   | -   | 2   | -   | -    | -    | -    | -    | -    | 2    | 3    |
|               | -   | 3   | -   | -   | -   | 3   | -   | 2   | -   | -    | -    | -    | -    | -    | -    | 3    |

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

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| Name & Sign of Program Coordinator | Sign & Seal of HoD |
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