# CE-118L Building Information Modelling (BIM) Lab

Credit Hours: 0+1 (Contact Hrs. 03)

Semester/year 2nd /1st Year

Prerequisites: None

Equivalent Courses:

**Course Aims**

* To introduce students with the user interface and the basic building components of a BIM software (FreeCAD, xBIM toolkit, Autodesk Revit or any other BIM software covering this
* course content).
* To enable students use BIM software in creating simple and complex drawings and detailing, and designing buildings structures.

**Course Intended Learning Outcomes (CLOs)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **CLO**  **No.** | **Description** | Assessment activitiesand weight percentage | TaxonomyDomain | PLO |
| **1** | Perform the linking of architectural information with structural information model of reinforced concrete, steel and masonry. | * In-lab Assessment * Final Laboratory Report | **P4** | **5 Modern Tool Usage** |
| **2** | **Define** different types of editing tools, levels, grids, views and different elements of a construction project. | * Final Laboratory Report * Final Term Paper * Final Lab Viva | **C4** | **1 Engineering Knowledge** |
| **3** | **Adopt** necessary protocols for preparing construction documents, annotations, detailing and scheduling. | * Final Laboratory Report * Final Lab Viva | **A3** | **8 Ethics** |

**Teaching and Learning Activities (TLAs)**

Course learning outcomes will be achieved through all or a suitable combination of the following teaching strategies.

* Quizzes
* Classroom discussions
* In-class activities
* Homework assignments
* Group assignments/projects
* Presentations by students
* Reports
* Self-study
* Any other suitable mean not covered above
* Mid-term major examination
* Final comprehensive examination

**Weekly course breakdown**

|  |  |  |
| --- | --- | --- |
| **TLAs** | | **Hours/Week** |
| **Lecturing:** Teaching Basic concepts of Building Information Modeling. Discussing different technical details throughout the semester. This will be done through handouts that will be already provided to students before coming to the class. Lectures are provided at: <http://civil.builders/> | | 1 contact hour per week |
| **Practicing:** Studentswill be practicing different tasks given in the demonstration independently on computer. | | 2 contact hours per week |
| **Week** | **Weekly Lectures** | **CLOs** |
| 1 | Introduction to BIM tools | 1 |
| 2 | Basic drawing and editing tools | 1, 4 |
| 3 | Setting up levels and grids | 1, 4 |
| 4 | Working with views | 1 |
| 5 | Starting a structural project based on a linked architectural model | 1, 2 |
| 6 | Adding structural columns and walls | 3 |
| 7 | Adding foundations and structural slabs | 3 |
| 8 | Structural reinforcement | 3 |
|  | ***Mid-Term Exam*** |  |
| 9 | Beams, trusses, and framing systems | 1, 3 |
| 10 | Analytical models and placing loads | 5 |
| 11 | Project practices to reinforce learning | 5 |
| 12 | Construction documents | 1, 3 |
| 13 | Annotating construction documents | 3 |
| 14 | Detailing | 1, 3 |
| 15 | Scheduling | 1, 3 |
| 16 | Revision of Designs | 4, 5 |
|  | ***Final-Term Exam*** |  |

# Assessment Activities

In-lab Assessment

Final Laboratory Report

Final Term Paper

Final Lab Viva

# In-Lab Assessment Rubrics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CLOs** | **Criteria** | **Levels of Achievement** | | | |
| **Poor** | **Fair** | **Good** | **Excellent** |
| 0-3 | 4-6 | 7-9 | 10-12 |
| **CLO1\*** | **Modelling Accuracy** | No attempt was made to accurately create the model. | Basic geometric shapes are present.  Major modelling errors  are still present. | Demonstrate ability to effectively create a model.  All necessary model elements are evident.  Three minor errors are present. | Exemplary understanding of the model.  All modelling elements are accurate and precise – no mistakes.  Utilized all necessary methods of model accurately. |
| **CLO3\*** | **BIM Tool Settings** | No attempt was made to setup the  model and layers correctly. | Attempt was made to setup  the model accurately.  Some evidence of utilizing levels is present.  Correct Template used. | Exemplary effort to utilize most settings accurately.  Exceptional use of levels and element types.  Correct template used. | Exemplary effort to utilize all settings accurately.  Exceptional use of grids, levels and element types.  Correct template used. |
| **CLO3\*** | **Completeness** | No real attempt was made to draw the Model. | Model is not completed as assigned. Some elements are missing, Properties are missing. Unwanted details are drawn. | Model is not completed as assigned. Some elements are missing. Properties are assigned. | All model component are completed as assigned. |
| **CLO3\*** | **Neatness** | Little or no effort to follow guidelines for neatness. | Completed model is not neatly done.  Poor layout (incorrect orientation) on the paper. | Completed model is neatly done.  Fair layout on the paper. And proper orientation. | Completed drawing is exceptionally neat. Positioned proportionately on the paper. Followed all guidelines for drawing neatness |
| **CLO3\*** | **Observance of discipline in lab** | Disturb other students. | Occasionally disturb other students. | Do not Disturb other students. | Help in maintaining inter lab discipline. |

\* Weight of each CLO of specific criteria for result compilation is attached in semester course folder.

**Report Assessment Rubrics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CLOs** | **Criteria** | **Levels of Achievement** | | | |
| **Poor** | **Fair** | **Good** | **Excellent** |
| 0-3 | 4-6 | 7-9 | 10-12 |
| CLO2\* | Appearance and formatting of BIM report**.** | All sections are not in proper order; handwriting is unreadable, formatting is not proper | Sections are partially in order;  handwriting is partially readable; formatting is partially acceptable | All sections are in order,  handwriting is readable, formatting generally good but could still be improved | All sections are well organized  and arranged in order; well- formatted; excellent handwriting and readable |
| CLO2\* | **Procedures, figures, graphs, tables, etc.** | Figures, graphs, tables contain errors and are poorly constructed, no captions or numbers, units are incorrect. | Most of figures, graphs, tables  are satisfactory, some relevant information are still missing | All figures, graphs, tables are correctly drawn, but some have minor problems or could be further improved | All figures, graphs, tables are  correctly drawn. Appropriate titles/captions. |
| CLO2\* | **Data analysis and results interpretation** | Data analyzed is marginally consistent | Data analyzed is acceptable but can’t sort trends/findings | Most of the data analyzed is correct but the trends/ findings are unclear | Represents all data appropriately and accurately so that trends and findings are clear |

\* Weight of each CLO of specific criteria for result compilation is attached in semester course folder.

**Viva Assessment Rubrics**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CLOs** | **Criteria** | **Levels of Achievement** | | | |
| **Poor** | **Fair** | **Good** | **Excellent** |
| 0-3 | 4-6 | 7-9 | 10-12 |
| CLO3\* | **To choose proper dressing** | Choose formal dressing | Choose a mix of formal and informal dressing | Dressing is informal and casual | Dressing is informal, casual and too flashy |
| CLO1\* | **To be able to repeat the lab work/tasks** | Repeat modelling/tasks inaccurately | Repeat the modelling/Tasks partially | Repeat the modelling/tasks with some hiccups | Repeat the complete modelling/Task as per the guidelines |
| CLO2\* | **To be able to explain the basic topics** | Could not explain the topic | Explain the topics in bit and pieces with no supporting material | Explain the topics but have no supporting material | Perfectly explain topics with supporting materials  (explanations, examples, illustrations,  Statistics and analogies) |
| CLO2\* | **To be able to explain the core topics** | Could not explain the topic | Explain the topics in bit and pieces with no supporting material | Explain the topics but have no supporting material | Perfectly explain topics with supporting materials  (explanations, examples, illustrations,  Statistics and analogies) |

\* Weight of each CLO of specific criteria for result compilation is attached in semester course folder.