



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad -500 043

CIVIL ENGINEERING

COURSE DESCRIPTOR

Course Title	BUILDING INFORMATION MODELING LABORATORY				
Course Code	ACE111				
Programme	B.Tech				
Semester	V	CE			
Course Type	Core				
Regulation	IARE - R16				
Course Structure	Theory			Practical	
	Lectures	Tutorials	Credits	Laboratory	Credits
	-	-	-	3	1
Chief Coordinator	S.Selvaprakash, Assistant Professor, Civil Engineering.				
Course Faculty	S.Selvaprakash, Assistant Professor, Civil Engineering Dr. K. Shruthi, Associate Professor, Civil Engineering.				

I. COURSE OVERVIEW:

Autodesk Revit Architecture is a powerful BIM tool used by architects throughout the globe to accomplish their projects. This course is designed to make the students familiar with the functionality of Autodesk Revit. The students will begin by learning about the user interface and then about Autodesk Revit commands used for design development followed by those for construction documentation. The objective of this course is to enable the students to create 2D and 3D architectural project models and extract their working drawings.

II. COURSE PRE-REQUISITES:

Level	Course Code	Semester	Prerequisites	Credits
-	-	-		-

III. MARKS DISTRIBUTION:

Subject	SEE Examination	CIA Examination	Total Marks
Building Information Modeling Laboratory	70 Marks	30 Marks	100

IV. DELIVERY / INSTRUCTIONAL METHODOLOGIES:

✗	Chalk & Talk	✗	Quiz	✗	Assignments	✗	MOOCs
✓	LCD / PPT	✓	Seminars	✗	Mini Project	✓	Videos
✗	Open Ended Experiments						

V. EVALUATION METHODOLOGY:

Each laboratory will be evaluated for a total of 100 marks consisting of 30 marks for internal assessment and 70 marks for semester end lab examination. Out of 30 marks of internal assessment, continuous lab assessment will be done for 20 marks for the day to day performance and 10 marks for the final internal lab assessment.

Semester End Examination (SEE): The semester end lab examination for 70 marks shall be conducted by two examiners, one of them being Internal Examiner and the other being External Examiner, both nominated by the Principal from the panel of experts recommended by Chairman, BOS.

The emphasis on the experiments is broadly based on the following criteria:

20 %	To test the preparedness for the experiment.
20 %	To test the performance in the laboratory.
20 %	To test the calculations and graphs related to the concern experiment.
20 %	To test the results and the error analysis of the experiment.
20 %	To test the subject knowledge through viva – voce.

Continuous Internal Assessment (CIA):

CIA is conducted for a total of 30 marks (Table 1), with 20 marks for continuous lab assessment during day to day performance, 10 marks for final internal lab assessment.

Table 1: Assessment pattern for CIA

Component	Laboratory		Total Marks
	Day to day performance	Final internal lab assessment	
CIA Marks	20	10	30

Continuous Internal Examination (CIE):

One CIE exams shall be conducted at the end of the 16th week of the semester. The CIE exam is conducted for 10 marks of 3 hours duration.

Preparation	Performance	Calculations and Graph	Results and Error Analysis	Viva	Total
2	2	2	2	2	10

VI. HOW PROGRAM OUTCOMES ARE ASSESSED:

Program Outcomes (POs)		Strength	Proficiency assessed by
PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.	2	Presentation on real-world problems
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.	2	Practical's
PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.	2	Presentation on real-world problems
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.	2	Seminar
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.	2	Presentation on real-world problems

3 = High; 2 = Medium; 1 = Low

VII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED:

Program Specific Outcomes (PSOs)		Strength	Proficiency assessed by
PSO 1	Engineering Knowledge: Graduates shall demonstrate sound knowledge in analysis, design, laboratory investigations and construction aspects of civil engineering infrastructure, along with good foundation in mathematics, basic sciences and technical communication.	2	Presentation on real-world problems
PSO 2	Broadness and Diversity: Graduates will have a broad understanding of economical, environmental, societal, health and safety factors involved in infrastructural development, and shall demonstrate ability to function within multidisciplinary teams with competence in modern tool usage.	2	Practical's
PSO 3	Self-Learning and Service: Graduates will be motivated for continuous self-learning in engineering practice and/ or pursue research in advanced areas of civil engineering in order to offer engineering services to the society, ethically and responsibly.	-	-

3 = High; 2 = Medium; 1 = Low

VIII. COURSE OBJECTIVES (COs):

The course should enable the students to:	
I	Provide familiarity with current BIM technologies.
II	Understand the shift from 2D representation to 3D simulation.
III	Synthesize, link and maintain continuity of existing and designed BIM information and other vital information into the model.
IV	Explore new project delivery systems and technologies for integrated practice.

IX. COURSE LEARNING OUTCOMES (CLOs):

CLO Code	CLO's	At the end of the course, the student will have the ability to:	PO's Mapped	Strength of Mapping
ACE111.01	CLO 1	Understand the basics of BIM and Autodesk Revit.	PO 1, PO 3, PO 5, PO 9, PO 12	1
ACE111.02	CLO 2	Learn about various drawing and editing tools available in Revit architecture.	PO 1, PO 5, PO 9	2
ACE111.03	CLO 3	Draw the setting up levels and grids in building using Revit software.	PO 1, PO 3, PO 9	3
ACE111.04	CLO 4	Draw a different types of modeling walls in building using Revit software	PO 1, PO 5, PO 9	3
ACE111.05	CLO 5	Draw the doors and windows in building using Revit software.	PO 1, PO 3, PO 5, PO 9	2
ACE111.06	CLO 6	Draw curtain walls in building using Revit software.	PO 1, PO 5, PO 9	2
ACE111.07	CLO 7	Work with different types of view in a building using Revit software.	PO 1, PO 3, PO 9	2
ACE111.08	CLO 8	To draw the adding components, modifying components & working with elements in building using Revit software.	PO 1, PO 5, PO 9	3
ACE111.09	CLO 9	Draw the modeling floors in a building using Revit software.	PO 1, PO 3, PO 5, PO 9	2
ACE111.10	CLO10	Model ceilings and roofs using Revit software.	PO 1, PO 3, PO 5, PO 9	2
ACE111.11	CLO11	Model stairs and railing using Revit software.	PO 1, PO 3, PO 5, PO 9	2

3 = High; 2 = Medium; 1 = Low

X. MAPPING COURSE LEARNING OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 1	1		2		1				1			2	1		
CLO 2	2				2				1					2	
CLO 3	3		2						3					2	
CLO 4	3				2				3				2		
CLO 5	2		2		2				2				2	2	
CLO 6	2				2				1					2	
CLO 7	2		2						2				1		
CLO 8	3				2				3					2	
CLO 9	2		2		2				2				2		
CLO 10	2		1		2				2					1	

Course Learning Outcomes (CLOs)	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO 11	1		2		2				2				2		

3 = High; 2 = Medium; 1 = Low

XI. ASSESSMENT METHODOLOGIES – DIRECT

CIE Exams	PO 1, PO 3, PO 5, PO 9, PO 12 PSO 1, PSO 2	SEE Exams	PO 1, PO 3, PO 5, PO 9, PO 12 PSO 1, PSO 2	Assignments	-	Seminars	PO 1,
Laboratory Practices	PO 9, PO 12, PSO 1	Student Viva	PO 9, PO 12, PSO 1	Mini Project	-	Certification	-

XII. ASSESSMENT METHODOLOGIES - INDIRECT

✓	Early Semester Feedback	✓	End Semester OBE Feedback
✗	Assessment of Mini Projects by Experts		

XIII. SYLLABUS

LIST OF EXPERIMENTS	
Week-1	INTRODUCTION TO BIM & AUTODESK REVIT
	About Autodesk and Autocad, workflow and BIM, Revit terms, overview of the interface, starting projects, viewing commands.
Week-2	BASIC DRAWING AND EDITING TOOLS
	Using general drawing tools, editing elements, working with modify tools.
Week-3	SETTING UP LEVELS AND GRIDS
	Setting up levels and grids, creating structural grids, adding columns, linking and importing CAD files.
Week-4	MODELING WALLS
	Modelling walls, modifying walls, model exterior shell, add interior walls.
Week-5	WORKING WITH DOORS AND WINDOWS
	Inserting doors and windows, loading door and window types from library, creating additional door and window sizes.
Week-6	WORKING WITH CURTAIN WALLS
	Creating curtain walls, adding curtain grids, working with curtain wall panels, attaching mullions to curtain grids.
Week-7	WORKING WITH VIEWS
	Setting the view display, duplicating views, adding callout views, elevations and sections.
Week-8	ADDING COMPONENTS
	Adding component, modifying component, working with elements.
Week-9	MODELING FLOORS
	Modelling & modifying floors, joining geometry, creating shaft openings, creating sloped floors

Week-10	MODELING CEILINGS & ROOFS
Modelling ceilings, adding ceiling fixtures, creating ceiling soffits, modelling roofs	
Week-11	MODELING STAIRS AND RAILING
Creating component stairs, modifying component stairs, working with railings, sketching custom stairs, creating ramps.	

XIV. COURSE PLAN:

The course plan is meant as a guideline. Probably there may be changes.

Week	Topics to be covered	Course Learning Outcomes (CLOs)	Reference
1	To understand the basics of BIM and Autodesk Revit.	CLO1	T1,T2
2	To learn about various drawing and editing tools available in Revit architecture.	CLO 2	T1,T2
3	To draw the setting up levels and grids in building using Revit software.	CLO 3	T1,T2
4	To draw a different types of modeling walls in building using Revit software	CLO 4	T1,T2
5	To draw the doors and windows in building using Revit software.	CLO 5	T1,T2
6	To draw curtain walls in building using Revit software.	CLO 6	T1,T2
7	To work with different types of view in a building using Revit software.	CLO 7	T1,T2
8	To draw the adding components, modifying components & working with elements in building using Revit software.	CLO 8	T1,T2
9	To draw the modeling floors in a building using Revit software.	CLO 9	T1,T2
10	To model ceilings and roofs using Revit software.	CLO 10	T1,T2
11	To model stairs and railing using Revit software.	CLO 11	T1,T2

XV. GAPS IN THE SYLLABUS - TO MEET INDUSTRY / PROFESSION REQUIREMENTS:

S NO	Description	Proposed actions	Relevance with POs	Relevance with PSOs
1	To improve standards and analyze the concepts.	Open ended problems	PO 1	PSO 1
2	Encourage students to solve real time applications and prepare towards real construction activities.	Open ended problems	PO 1	PSO 1

Prepared by:

Mr. S. Selva Prakash, Assistant Professor

HOD, CE