COURSE CONTENT

Academic Year	2019-2020	**Semester**	2
Course Coordinator	A/P LIE SENG TJHEN		
Course Code	CV1711		
Course Title	Engineering Drawing and 3D Building Information Modelling		
Pre-requisites	NIL		
No of AUs	1		
Contact Hours	Total: 39 Hours (Laboratory: 13 hours)		
Proposal Date	12 February 2020		

Course Aims

The aims of the course are to:

i) Teach students about the principles of engineering drawings, create typical drawings using Computer Aided-Design (CAD) tools, read and interpret civil and structural engineering drawings;

ii) Use a Building Information Management (BIM) software to create the 3D models, precast concrete and other typical civil engineering parts.

Course Learning Outcomes (Course LO)

By the end of this course, the student should be able to:

1. Classify 3D model, 2D drawing, setting parameters, standard and layout in AutoCAD environment.
2. Create, edit and modify different basic 2D objects.
3. Apply concepts of 1st and 3rd Angle Projection in engineering drawings.
4. Apply concepts of First Auxiliary Elevation and Plan Based on 1st Angle Projection.
5. Apply concepts of First Auxiliary Elevation and Plan Based on 3rd Angle Projection.
6. Produce inclined plan view in orthographic projection.
7. Define different structural families, exporting parts, creating drawings and set parameters in AutoCAD Revit environment.
8. Create and modify 3D parts using extrusion, sweep, blend and cutting void.
9. Produce drawings, views, hidden lines, scale, shading and printing.
10. Use AutoCAD Revit to create elevation, plan, end view and isometric view using 1st Angle Projection.
11. Use AutoCAD Revit to create elevation, plan, end view and isometric view using 3rd Angle Projection.

Course Content

S/N	Topic	Laboratory Hours
1	Principles of engineering drawings	1
2	Civil and structural engineering drawings practices	1
3	Principle of tangency	1
4	First and third angle projection	1
5	Sectional view	1
6	Isometric view	1
7	2D Computer Aided-Design (CAD) – AutoCAD software	15
8	Building Information Modelling (BIM)	3
9	3D Computer Aided-Design (CAD) – Revit software	15
	Total:	39

Components	**Course LO tested**	**Related programme SLO or graduate attributes**	**weighting**	**Team/ Individual**	**Assessment rubrics**
1. Continuous Assessment 1 Quiz No.1	1, 2, 3, 4, 5, 6	EAB SLOs (a), (b)	50%	Individual	
2. Continuous Assessment Quiz No.2	6, 7, 8, 9, 10	EAB SLOs (a), (b)	50%	Individual	
Total			100%		

*CEE SLOs = Student Learning Outcome For Civil Engineering Progamme (Per BEng Civil Engineering Accreditation)

Related Programme LO or Graduate Attributes

a. **Engineering knowledge:** Apply the knowledge of mathematics, natural science, engineering fundamentals, and an engineering specialisation to the solution of complex engineering problems;

b. **Problem Analysis:** Identify, formulate, research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences;

c. **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 public health and safety, cultural, societal, and environmental considerations.

d. **Investigation:** Conduct investigations of complex problems using research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions

e. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

f. **The engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

g. **Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for the sustainable development.

h. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

i. **Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams and in multidisciplinary settings.

j. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

k. **Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and economic decision-making, and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

l. **Life-long Learning:** Recognise the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

Formative feedback

1. Feedback will be through the dissemination of the student's performance in quizzes as well as review of the quiz questions in class.
2. We encourage you to initiate an Individual consultation sessions on your particular learning needs.

Learning and Teaching approach

Approach	How does this approach support students in achieving the learning outcomes?
Laboratory	Weekly laboratories to provide you with the specific knowledge and techniques to achieve the learning outcome stated above, and to complete the two continuing assessments.

Textbooks/References:

1. Parker M. A. and Pickup F. (1991), "Engineering Drawing with Worked Examples", Vol. I and II", 3rd edition, Stanley Thornes Ltd., England, U.K., 1991.
2. Autodesk™ (2018), "Autodesk AutoCAD Essentials Courseware", Autodesk, Inc., U.S.A., 2018.
3. Autodesk™ (2018), "Autodesk Revit Essentials Courseware", Autodesk, Inc., U.S.A., 2018.
4. Karen K. and Douglas N. (2014), "Building Information Modelling: BIM in Current and Future Practice", 1st edition, John Wiley & Sons, Inc., Hoboken, New Jersey, U.S.A., 2014.
5. Eddy K. and James V. (2015), "Mastering Autodesk Revit Architecture 2015: Autodesk Official Press", John Wiley & Sons, Inc., Indianapolis, Indiana, U.S.A., 2015.

Course Policies and Student Responsibilities

The standing university policy governing student responsibilities shall apply.
No special policy for this course.

Academic Integrity

Good academic work depends on honesty and ethical behaviour. The quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honour Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at NTU. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, collusion, and cheating. If you are uncertain of the definitions of any of these terms, you should go to the academic integrity website for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.

Course Instructors AY2019/2020

Instructor	Office Location	Phone	Email
A/P Lie Seng Tjhen	N1-01c-78	6790 5284	cstlie@ntu.edu.sg

Planned Weekly Schedule

Week	Topics	Course LO	Activities
1	AutoCAD 2018 Essentials : Drawing Fundamental, Layout and Standards	1	Laboratory
2	AutoCAD 2018 Essentials : Creation and Modifying Objects	2	Laboratory
3	Orthographic Projection, 1st and 3rd Angle Projection	3	Laboratory
4	First Auxiliary Elevation and Plan Based on 1st Angle Projection	4	Laboratory
5	First Auxiliary Elevation and Plan Based on 3rd Angle Projection	5	Laboratory
6	Orthographic Projection Inclined Plan View	6	Laboratory
7	Continuous Assessment 1		Quiz No.1
8	AutoCAD Revit 2018 : Parameters, Environment and Creation of Structural Families	7	Laboratory
9	AutoCAD Revit 2018 : Creation and Modifying Parts Using Extrusion, Sweep, Blend and Cutting Void	8	Laboratory
10	AutoCAD Revit 2018 : Drawing, Dimensions, Views, Hidden Lines, Scale and Shading	9	Laboratory
11	1st Angle Projection Exercises with Four Views	10	Laboratory
12	3rd Angle Projection Exercises with Four Views	11	Laboratory
13	Continuous Assessment 2		Quiz No.2