

New Graduate Course Proposal

Form Procedure

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Course Title

Course Title: * Building Information Modeling Applications in CM

Proposed Banner Abbreviation: * BIM Applications in CM

Banner limit of 30 characters, including punctuation, spaces, and special characters.

Department/Committee Information

The main contact person for the Graduate Curriculum Committee should fill out this form.

Requestor Name: * Nirajan Mani

Members of the Graduate Curriculum Committee: Dr. Nirajan Mani, Dr. Wayne Whitfield, Dr. Soumitra Basu, Dr. Abdel Gabar Mustafa, Dr. Hong Yu

Department / Unit Developing: * Engineering Technology

Chair of Department for Program: * Nirajan Mani Chair Email: * Nirajan Mani nmani@fitchburg

Academic Dean of Department or Program: * Margaret Hoey Academic Dean E-mail: * <Dr. Hoey> mhoey@fitchburg

Program Chair Yes
 No
The Program Chair for this request is among the people listed above.

Course Information

Course Description

* This course focuses on the skills and information needed to effectively use an existing Building Information Model (BIM) for construction engineering and management practices. This is a project-based course where students gain knowledge on the implementation of BIM concepts throughout the lifecycle of a building, from planning and design, to construction and operations.

Rationale and expected outcomes of offering the Course

* The objective of this course is to introduce students to concepts of model-based workflows in the construction industry using Building Information Modeling (BIM) technologies. Students in this class will understand how construction practices can be improved by BIM.

Expected Outcomes:

1. A knowledge of Building Information Modeling (BIM) technologies;
2. A knowledge of BIM applications in the improvement of the engineering and construction practices
3. An up-to-date knowledge different software programs used as functionalities of BIM for modeling, design, visualization, and clash detection processes.

Number of Credits: * 3

Discipline Prefix or Prefixes: * CMGT Brief rationale if more than one prefix:

Level of Course: * 7000 Brief rationale for level choice::

The course will be: 8000 9000

Requirement Elective

Is there a similar undergraduate course? Yes No

Does this course affect offerings in any other department or program? Yes No

Course Enollment

Expected Average Enrollment:

This course is a replacement for:

Has the course been offered previously as a "Topics" course? Yes No

Is this an Extended Campus Course? Yes No

Which semester will this course be offered for the first time?: How often thereafter to be offered?:

Course Requirements

Prerequisite course(s) if any:

Additional Requirements
 Laboratory Hours: Fieldwork Hours:
 Pre-Practicum Hours: Practicum Hours:

Other Requirements (specify):

Syllabus Upload

New Course Syllabus Upload:

Signatures

*Click on the **Submit Form** button at the bottom of the page after you have signed the form. You should receive an email confirmation that your signature has been completed.*

...3531353430
Nirajan Mani 03/21/2022
 Requester Signature Date

...3232323130
Nirajan Mani 04/18/2022
 Department Chair Approval Date

 Academic Dean Signature Date

 SGOCE Dean Signature Date

 Approval of the Graduate Council Date

 Approval of the President Date

Notification

Reviewed by the Registrar: _____

Reviewed by the Library: _____

Retired form

SGOCE Admin. Assistant
Signature

Electronically signed by Denise Bertrand on 05/01/2022 1:07:41 PM



School of Graduate Online and Continuing Education (SGOCE)
Department of Engineering Technology
SYLLABUS
Spring 2024

Class Information:

Course: CMGT 8XXX (Building Information Modeling Applications in CM)
Credits: 3
Class Modality: Online
Class Start Date: TBD
Class End Date: TBD

Instructor Information:

Dr. Nirajan Mani
Office: CNIC 209A
Phone: 978-665-4843
Email: nmani@fitchburgstate.edu
Office Hours: M/W (11:00 A. M. – 12:15 P. M.) (By Appointment)

Textbook:

Building Information Modeling: BIM in Current and Future Practice (1st Ed)
Authors: Karen Kensek, Douglas Noble
Publisher: Wiley
ISBN: 978-1118766309

References:

BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors (2nd edition)
Authors: Chuck Eastman, Paul Teicholz, Rafael Sacks, Kathleen Liston
Publisher: Wiley
ISBN-13: 978-0470541371

BIM and Construction Management: Proven Tools, Methods, and Workflows.
Authors: Brad Hardin, Dave McCool
Publisher: John Wiley & Sons
ISBN-13: 978-1118942765

Supplementary Materials: Handout materials will be provided by instructor

Catalog Description:

This course focuses on the skills and information needed to effectively use an existing Building Information Model (BIM) for construction engineering and management practices. This is a project-based course where students gain knowledge on the implementation of BIM concepts throughout the lifecycle of a building, from planning and design, to construction and operations.

Prerequisite: None

Course Objectives:

This course introduces concepts of model-based workflows in the construction industry using Building Information Modeling (BIM) technologies. Students will understand how construction practices can be improved by BIM application. This course covers topics, such as BIM for modeling, design/construction coordination, estimating, scheduling, safety planning, as-built modeling, etc. Demonstrated virtual Labs will help students to learn hands-on skills of using BIM-related software programs and real-world project information. Different software programs will be used to teach major concepts and functionalities of BIM for modeling (Autodesk Revit), multidisciplinary design coordination and clash detection (Autodesk Navisworks, Assemble Systems), construction visualization (Autodesk Navisworks, Assemble Systems), cost estimating (RS Means, Assemble Systems), etc. After learning leading industry practices and tools, students will conduct research studies. Students will identify technical limitations and drawbacks in current practices and propose conceptual or well-developed solutions to overcome the problems.

Students Learning Outcomes:

Student will have:

1. A knowledge of Building Information Modeling (BIM) technologies;
2. A knowledge of BIM applications in the improvement of the engineering and construction practices
3. An up-to-date knowledge different software programs used as functionalities of BIM for modeling, design, visualization, and clash detection processes.

Learning Outcomes Assessment:

Assessment tools for the above learning outcomes include homework & quizzes (outcomes: 1, 2, 3), demonstrated lab activities (outcomes: 3), and exams (outcomes: 1, 2, 3).

Instructor Availability:

Instructor will be available during weekdays to respond your questions or concern via university email. Please contact instructor via university email if you have any questions or concern to avoid spam issue. However, this is an online class, we will use Google Meet / Hangouts for all student requested meetings.

Instructional Strategies:

The course will be conducted in a lecture and demonstrated laboratory format (remote / online format). This class may use lectures, demonstrations, self-guided study, group discussions on the blackboard, collaborative learning groups, project work, and recorded presentations to cover the topics in this course. PowerPoint presentations, computer applications, etc. may be utilized. Some independent learning is expected of the students; they should complete assigned readings and actively engage in discussions and activities. Every effort will be made to meet the individual needs and various learning styles of the course. It is most important that you inform the instructor at the beginning of the semester of any particular unique needs.

Course Topics:

The following topics will be covered in the course. The following listing is a general indication of the order of their coverage. However, faculty instructor reserves the right to change the order of coverage and the topics to be covered based upon the class’s performance and interests.

1. Introduction to BIM
2. Basic modeling and project navigation
3. Overview of BIM uses for construction management
4. BIM tools and new workflows of construction planning & management
5. Model-based quantity-takeoff and cost estimating
6. Scheduling and planning with 4D BIM
7. Construction safety planning using BIM
8. Cloud-BIM for design/construction coordination & clash detection
9. Point cloud data for as-built modeling
10. Rule-based model checking
11. Case study: BIM for construction management
12. Future of BIM

Grading System:

Range	Letter Grade	Quality Points
95 - 100	A	4.0
92 - 94	A-	3.7
89 - 91	A- / B+	3.5
86 - 88	B+	3.3
83 - 85	B	3.0
80 - 82	B-	2.7
77 - 79	B- / C+	2.5
74 - 76	C+	2.3
71 - 73	C	2.0
0 – 70	C-	0
Withdrawn		W
Incomplete		IN
In-Progress		IP
Audit		AU
Satisfactory		S
Unsatisfactory		U

** Grades that fall between intervals will be rounded to the higher number.*

Evaluation Criteria:

Quizzes	10%
4 Homework/ Lab Reports	40%
Exam (2 Exams @ 15%)	30%
Final Project	20%

** The instructor reserves the right and the responsibility for adjusting these items and their weights as necessary to meet specific situations as they may arise.*

Student Responsibilities and Class Requirements:

Each student is responsible for completing all course requirements and for keeping up with all activities of the course. Students are required to complete all assigned homework, quizzes, exams, and project work by the given deadline.

Policy on Assignments:

All assignments must be turned in on the blackboard on Sundays per the documented dates in the syllabus. Feedback to your submissions will be posted on the blackboard within 72 hours (96 hours for a class of 60 or more students) after the weekly submission due date and time. It means that if you chose to submit your assignment early, it will be graded at the scheduled time and not before. Work submitted after due date will receive a grade of zero. All assignments must conform to APA writing style and include a reference list (not a work cited or bibliography).

Students with extenuating circumstances, such as a medical emergency or other emergencies must provide written proof of such event, and report such events within 24 hours and make arrangement to complete assignments in a timely manner. Failure to do so will result in a penalty up to 50%. Make up examinations (if part of course) will only be offered at the discretion of the instructor.

Technology Initiatives:

Users of the Fitchburg State University computer systems are subject to all applicable federal, state, and international computer laws. Questions regarding regulations may be directed to the office of Information Technology Systems.

(Note: It is recommended that students back up all of their work on a flash drive.)

Students will utilize technology as:

- A research tool; (a means of discovering current trends and substantive research articles in education)
- A demonstrated laboratory activity
- A communication method
- An enhancement tool for the design of PowerPoint presentations (for recorded presentations-individual/group)

Fitchburg State University Library Online Services:

The Fitchburg State University Library online services may be accessed through the Fitchburg State University Homepage <https://library.fitchburgstate.edu/>. Students may access any of several full-text online databases. Passwords are available to students by calling 978.665.3063. Students may access the Fitchburg State University Career Service and Counseling Services Center via the college's homepage at <https://www.fitchburgstate.edu/student-support/career-support/career-resources>.

Disabilities Accommodation:

Students requiring course alterations or accommodations due to a disability or emergency medical condition, should inform instructor as soon as possible. You should also work with the Disability Services Office (978-665-4020). They will provide you with the forms needed to determine the particular accommodations that your situation merits.

University Academic Dishonesty Policy:

Fitchburg State University’s policy on Academic Dishonesty will be enforced in this course. Please refer to the university catalog on this policy. Plagiarism and cheating are inexcusable. Any instance of plagiarism or cheating will result in lowered grade and possible failing the course.

Tentative Schedule:

Week	Topics	Remarks
Week 1	Introduction to BIM	
Week 2	Basic modeling and project navigation	<i>Homework 1 due</i>
Week 3	Overview of BIM uses for construction management	
Week 4	BIM tools and new workflows of construction planning & management	<i>Homework 2 due</i>
Week 5	Model-based quantity-takeoff and cost estimating	<i>Quiz 1 due</i>
Week 6	Scheduling and planning with 4D BIM	<i>Assign Final Project</i>
Week 7	Construction safety planning using BIM	<i>Exam I due</i>
Week 8	Cloud-BIM for design / construction coordination & clash detection	
Week 9	Point cloud data for as-built modeling	<i>Homework 3 due</i>
Week 10	Rule-based model checking	
Week 11	Final Project plan presentation	<i>Homework 4 due</i>
Week 12	Case study: BIM for Construction Management	
Week 13	Future of BIM	<i>Quiz 2 due</i>
Week 14	Project Week / Recorded Project Presentation	<i>Project Report & Presentation due</i>
Week 15	Final Exam	<i>Exam II due</i>

Note: The instructor reserves the right to modify this syllabus and schedule.