**BC 6050: Building Info Modeling**

**Course Policy, Procedures, and Syllabus**

*School of Building Construction, Georgia Institute of Technology*

|  |  |
| --- | --- |
| **Course Title** | Building Information Modeling for Multi-disciplinary Integration |
| **Course No** | BC 6050 |
| **Time** | 6:05 -8:55pm Tuesday |
| **Classroom** | Architecture (West) 359 |
| **Semester/Year** | Fall/2015 |
| **Instructor** | Dr. Pardis Pishdad-Bozorgi |
| **Email** | pardis.pishdad@gatech.edu |
| **Office** | IPST Room 531 (500 Tenth Street, NW, 5th Floor, Atlanta, GA 30318) |
| **Office Phone** | 404.894.7100 |
| **Office Hours** | Wednesday 10:00am-12:00pm or by appointment |
| **Recommended Readings** | * BIM Handbook by Eastman, Teicholz, Sacks, Liston, 2011, Second Edition,   Wiley, ISBN: 978-0-470-54137-1   * BIM and Construction Management by Brad Hardin, 2009, Wiley, ISBN: 9780-470-40235-1 * Other reading materials will be posted on T-Square |
| **Course Description** | This multi-disciplinary course introduces AECFM students (Architecture, Engineering, Construction, and Facility Management students) to Building Information Modeling (BIM) and discusses the changes this revolutionary paradigm has been causing to the traditional design, planning, management, construction, facility management, and contracting practices.  As a digital representation of the built environment, BIM refers to a series of parametric, object-oriented digital modeling technologies and integrated processes, utilized to develop, analyze, document, and share digital data, 3D geometry, 4D simulation, and 5D integrated cost estimation of facilities. BIM aims to streamline the workflow processes involved in a facility life cycle, from project inception to demolition.  This course introduces the students to the latest research and development on BIM technologies, processes, and implementation practices. It discusses the profound advantages that the effective use of BIM can provide to all members of a project team and the existing challenges towards its implementation. As BIM technology evolves, new applications emerge and practices continuously evolve. Through real world case studies, the class learns about the BIM current state of practice, the opportunities realized as a result of BIM implementation, and the existing challenges. The class explores potential future applications of BIM, ways to overcome the existing challenges, and propose innovative practices to better realize BIM opportunities in the future.  The learning environment of the class is shaped through various interactive teaching techniques, such as class discussions, case studies, and computer lab. In computer lab, a particular emphasis is placed on the application of BIM in planning, coordination, and construction management. Using Navisworks and Synchro, the students learn to conduct coordination between different disciplines, perform clash detection, create 4D simulation, use annotation tools to markup a model, navigate through a model, create an animation, etc.  This class aims to promote multi-disciplinary teamwork and discussion on ways to eliminate traditional silos between disciplines. It encourages participation of students with different background, including Building Construction, Architecture, Civil Engineering, Facility Management, and Mechanical & Electrical Engineering. |
| **Learning Objectives** | At the end of this course students will be able to:  1. Define BIM, its history, technologies, and processes  2. Describe the applications of BIM throughout different phases of a project life cycle  3. Analyze potential impacts of BIM on traditional processes  4. Analyze the benefits and challenges of BIM implementation  5. Design BIM implementation strategies  6. Forecast potential future trends associated with the advent of  BIM-enabled design, fabrication, construction, and operation of buildings  7. Utilize a BIM tool effectively to support planning and coordination activities |

**Assignment and Evaluation[[1]](#footnote-1)**

Final grades will be based on an aggregate point total for projects, classroom participation, quizzes, homework assignments, and lab projects. Course grading is as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **F** |
| 90% and above | 80%-89% | 70%-79% | 60%-69% | <60% |

**Points:** The following table summarizes the points for this course. Group assignments will be graded for the entire group, and evaluation of individual team members will become part of the final grade.

|  |  |  |
| --- | --- | --- |
| Criteria | **Description** | **Percent** |
| Assignments & Quizzes | Quizzes on assigned readings | 10 |
| Lab Assignments | 50 |
| Attendance & participation | Attendance & participation in class discussion | 10 |
| Final projects | BIM Research & a Proposal on Future BIM Trends | 30 |
| **TOTAL** |  | **100%** |

Final Project Description: Choose a research subject from the following suggested topics, listed on T-Square (e.g. BIM & Modularization, Interoperability and Open Standards, BIM for Facility Management, BIM use in the Field, BIM and location-based planning, etc.), and conduct a literature review and interviews with the practitioners in the industry to understand and present the current state of the practice on the topic. Furthermore, discuss your vision on the future direction for potential advancement on the topic, based on the current trends, existing opportunities for improvement, and the historical evolution of the technology and the processes related to the topic. The paper length should not exceed 7000 words and must include title, abstract, introduction and background, research goal, research methodology, findings and discussion, vision for potential future trends or future research, conclusion, and references.

**Course Schedule**

|  |  |  |
| --- | --- | --- |
| **Week** | **Topics** | **Assigned Readings** |
| 1  Aug 19 | Course outline  Introduction to Building Information Modeling (BIM) | BHB Chapter 1 |
| Navisworks 2014 |  |
| 2 | Project Delivery Methods Compatible with BIM | BIM & CM by Hardin, Chapter 1 |
| Navisworks 2014 |
| 3 | BIM for Architects and Engineers | BHB Chapter 5 |
| Navisworks 2014 |
| 4 | BIM for Contractors and Mangers | BHB Chapter 6 |
| Navisworks 2014 |  |
| 5 | BIM for Subcontractors and Fabricators | BHB Chapter 7 |
| Navisworks 2014 |
| 6 | Dayton Hospital Case Study by ENR: Prefabrication | T-Square Reading |
| Navisworks 2014 |  |
| 7 | BIM for Facilities Operation and Maintenance | BIM & CM by Hardin, Chapter 7 |
| Navisworks 2014 |
| 8 | BIM & Multi-Disciplinary Coordination | T-Square Reading |
| Synchro |
| 9 | FALL 2014 STUDENT RECESS |  |
| 10 | BIM and Interoperability: Use of open standards | T-Square Reading |
| Synchro |  |
| 11 | Contracting for BIM & BIM Implementation Strategies | BIM & CM by Hardin, Chapter 2 |
| Synchro |  |
| 12 | IPD & Sutter Medical Case Study | Case in BHB Chapter 9 |
| Synchro |
| 13 | Trust-building and Collaboration | Read Case Study on T-  Square |
| Synchro |
| 14 | BIM Implementation in the Industry |  |
| Synchro |
| 15 | Future directions of BIM  Course review & close out | BHB Chapter 8 |
| Synchro |
| 16 | Final | Final |

\* The syllabus is subject to change with prior notice. Please check the latest version at T-square.

**COURSE POLICIES**

In the following policies, ‘you’ indicates the ‘student’ and ‘instructor’ means ‘faculty’ or ‘professor.’

**Policies and Expectations:** This course will be an intense; it is necessary that we all contribute to its success by following the course policies. You should not only be in class, but also strive to participate in class discussions when appropriate.

**Assignment Deadlines:** All assignments given are due on the date announced in class and T-square website. All students are expected to complete any and all assignments given. The instructor reserves the right to modify assignments as necessary. You will not receive credit for late assignments (homework, projects, readings, and others). However, the instructor will accept and correct these assignments, in order to provide you with feedback that will be beneficial in the learning process. Group assignments will be graded for the entire group, and evaluation of individual team members will become part of the final grade.

**Class Attendance Policies:** Attendance is mandatory for all class lectures, labs, site visits, and exams, unless you are ill or officially excused by the instructor as the result of participation in a university function. There are no “free cuts” permitted and there will be a penalty (as decided by the instructor) for not attending the class. If you attend fewer than 75% of the scheduled class meetings, you will not receive credit for the course. Any student arriving late for class or leaving early from class will be counted as absent from that class period. This policy is in your best interest, since attendance is essential for understanding some of the complex reasoning processes covered in this course which is critical for doing well in this class. In the case of unavoidable absences, you are responsible for making up the work done in class. It is not the instructor’s responsibility to provide the student with that information outside of class. It is your responsibility to obtain any missed information or handouts given in class from a classmate and you should exchange phone numbers or e-mail addresses with other students in the class to better facilitate note sharing, etc. No companions, friends, family, or pets are permitted in class.

**Methods of Communicating:** You can ask questions and ask for clarification by e-mail, in class, or by visiting the instructor by appointment at his/her office. Students are not permitted to discuss grades with the instructor via e-mail, only in-person.

**Method of Instruction:** The course may consist of a combination of lectures, discussion, videos, presentations by industry professionals, labs, and teamworks. This course is not a training course. You will not be trained to master a software package, a computer application or a professional certification. You will be taught to solve problems by understanding the problem, synthesizing it, hypothesizing potential solution methods and implementing a selected procedure toward its solution. It is your responsibility to learn the software tools. **Readings, Preparation and Participation:** The reading assignments, problems cases and discussion forums are an integral element of the course. Students are expected to complete readings and other assigned work prior to each class, in order to fully participate in the discussion. Learning is approached as a participatory process, which benefits from student/teacher and student/student interaction. The lectures may not explicitly follow the assigned book reading, but are designed to bring together diverse information from various sources. Although the book is listed as “recommended”, it does not guarantee a satisfactory performance. You must search additional sources on your own to complement class lectures.

**Field Trips:** Field trips visits, if any, are mandatory and are meant as an enrichment experience. Field trip locations will be announced prior to the scheduled visit. It is the student’s responsibility to wear hard-toed shoes, hard hats, protective eye cover (on certain sites) and long trousers/slacks during the field trip. Students are required to fill out and sign the Georgia Tech’s “Release and Waiver of Liability” form, as well as any other forms required by the company whose site is being visited.

**Laptop/Handheld Computer Use:** Laptop/handheld computers may be used in class to take notes ONLY, and to work on assigned projects but not for other purposes, such as e-mail, Web site searches, chat, or other personal uses. Students using computers during class for work not related to that class must leave the classroom for the remainder of the class period. Abuse of this policy will result in the prohibition of laptop use by this student. **Cell Phones:** All communication devices must be turned off in the classroom. The use of cell phones, beepers, or other communication devices is disruptive, and is therefore prohibited during class. No personal listening devices or personal transportation devices are permitted.

**Make-up Exams:** There will be no make-up exams under any circumstances, except medical reasons. Provide your instructor with a letter from your medical doctor to schedule a make-up exam.

**Food and Drink in the Classroom:** Students are not allowed to bring food or drinks into classroom.

**Class Discussions:** Your active and productive participation in class discussions is encouraged. Various viewpoints and opinions are encouraged and welcome. Questioning the ideas of others, including the instructor, is similarly welcome. However, the instructor will exercise his/her responsibility to manage the discussions so that ideas and argument can proceed in an orderly fashion. If your conduct during class discussions seriously disrupts the atmosphere of mutual respect, you will not be permitted to participate further.

**Instructor’s Absence or Tardiness:** If the instructor is late in arriving to class, you must wait a full 20 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions the instructor may give you about an anticipated absence or tardiness.

**Plagiarism:** Students are expected to do their own work in this course. To use another writer’s or speaker’s ideas without giving proper credit by means of standard documentation is plagiarism. All course papers, notes, homework, and projects submitted to the instructor are subject to textual similarity review for the detection of plagiarism. All submitted papers will be included as source documents in the reference database for the purpose of detecting plagiarism of such papers. The instructor will follow the Institute’s policy for plagiarism. **Academic Misconduct/Honor Code:** Students in this course are responsible for behaving in accordance with the Georgia Tech Academic Honor Code. The Institute Student Honor Code is printed in the Georgia Tech General Catalog, as well as available on the Web at: [www.honor.gatech.edu.](http://www.honor.gatech.edu/)

**Disabilities:** Any student that may need an accommodation for any sort of disability should contact the ADAPTS Office: Assistant Dean/Coordinator for Students with Disabilities, Smithgall Students Services Building, Suite

221. The phone number is (404) 894-2564.

**Computer Specifications:** For information on computer specifications to meet Georgia Tech standards, visit [www.coa.gatech.edu/computing/comp\_specs.htm.](http://www.coa.gatech.edu/computing/comp_specs.htm) Internet access is required for this course, as is an e-mail account for communication with the instructor.

**Policy Changes:** Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

**Supplemental Policies:**

The following supplemental policies will supersede the previous policies listed above, at the discretion of the instructor.

**Regrading:** Student has until one week after receiving his/her grade on a homework, lab assignment or exam to dispute the grade. Handling regrades in this manner eliminates the “end of semester” digging for points. When disputing a grade, you should state the question, the dispute, and the number of points you feel you should have received for the question. Note that when you ask for a question to be regraded, the entire assignment may be regraded, and there is a possibility of losing points. The above policy applies to the final exam as well.

**Syllabus modification:** The instructor reserves the right to make changes to the syllabus as she seems appropriate. It is your responsibility to refer to the online syllabus posted on the T-Square for most updated information.

1. The final project for graduate students is different from undergraduate students. Please note the description of the final project above. [↑](#footnote-ref-1)