**NEW COURSE PROPOSAL CHECK LIST**

Use this checklist to ensure that all required documentation has been included. You may wish to use this checklist as a table of contents within the new course proposal.

|  |  |
| --- | --- |
| **Completed NEW COURSE PROPOSAL FORM** |  |
| * Title, Number, Credits, Hours, Catalog course description
 | **See Page 4** |
| * Brief Rationale
 | **See Page 4** |
| Completed [Library Resources and Information Literacy Form](http://www.300jaystreet.com/college-council/resources/2013/10/curriculum_modification_library_form.doc) | **See Page 13** |
| **Course Outline** Include within the outline the following. |  |
| Hours and Credits for Lecture and LabsIf hours exceed mandated Carnegie Hours, then rationale for this | **See Page 8** |
| Prerequisites/Co- requisites | **See Page 8** |
| Detailed Course Description | **See Page 8** |
| Course Specific Learning Outcome and Assessment Tables* Discipline Specific
* General Education Specific Learning Outcome and Assessment Tables
 | **See Page 10** |
| Example Weekly Course outline | **See Page 11~12** |
| Grade Policy and Procedure | **See Page 8** |
| Recommended Instructional Materials (Textbooks, lab supplies, etc) | **See Page 8** |
| Library resources and bibliography | **See Page 9** |

|  |
| --- |
| **Course Need Assessment.** Describe the need for this course. Include in your statement the following information. |
| Target Students who will take this course. Which programs or departments, and how many anticipated? Documentation of student views (if applicable, e.g. non-required elective). |
| **Course will be an elective. In addition to Architectural Technology students, those enrolled in other departments may be allowed to enroll in the course. This may include but will not be limited to departments in the School of Technology and Design (CMCE, MECH, ECFM)** |
| Projected headcounts (fall/spring and day/evening) for each new or modified course. |
| **One (1) section per semester of 20-25 students.** |
| If additional physical resources are required (new space, modifications, equipment), description of these requirements. If applicable, Memo or email from the VP for Finance and Administration with written comments regarding additional and/or new facilities, renovations or construction. | **None** |
| Where does this course overlap with other courses, both within and outside of the department? |
| **It does not overlap directly with other courses.** |
| Does the Department currently have full time faculty qualified to teach this course? If not, then what plans are there to cover this? |
| **Yes** |
| If needs assessment states that this course is required by an accrediting body, then provide documentation indicating that need. | **NA** |
| **Course Design**Describe how this course is designed.  |  |
| Course Context (e.g. required, elective, capstone) | **Elective** |
| Course Structure: how the course will be offered (e.g. lecture, seminar, tutorial, fieldtrip)? | **Lecture, workshop** |
| Anticipated pedagogical strategies and instructional design (e.g. Group Work, Case Study, Team Project, Lecture) | **Case Study, Lecture, Team Project** |
| How does this course support Programmatic Learning Outcomes? |
| **As an upper level experience, this course will allow students to learn quantitative methods to reinforce and master skills toward sustainable architecture.** |
| Is this course designed to be partially or fully online? If so, describe how this benefits students and/or program. | **No** |
| **Additional Forms for Specific Course Categories** |  |
| Interdisciplinary Form (if applicable) (under development) | **NA** |
| [Common Core (Liberal Arts) Intent to Submit](http://www.300jaystreet.com/college-council/resources/2013/10/CommonCoreCourseSubmissionForm_4.2.12.doc) (if applicable) | **NA** |
| Writing Intensive Form if course is intended to be a WIC (under development)  | **NA** |
| If course originated as an experimental course, then results of evaluation plan as developed with director of assessment. | **NA** |
| **(Additional materials for** [**Curricular Experiments**](http://www.300jaystreet.com/college-council/curriculum_proposals/curricular-experiments)**)** |  |
| Plan and process for evaluation developed in consultation with the director of assessment. (Contact Director of Assessment for more information). | **NA** |
| Established Timeline for Curricular Experiment | **NA** |

New York City College of Technology, CUNY

NEW COURSE PROPOSAL FORM

This form is used for all new course proposals. Attach this to the [Curriculum Modification Proposal Form](http://www.300jaystreet.com/college-council/resources/2010/04/2013-10-10-Curriculum_Modification_Proposal_Form.docx) and submit as one package as per instructions. Use one New Course Proposal Form for each new course.

|  |  |
| --- | --- |
| **Course Title** | **Advanced Simulation for High Performance Buildings** |
| **Proposal Date** | **September 31, 2014** |
| **Proposer’s Name**  | **Jihun Kim** |
| **Course Number** | **ARCH 4750** |
| **Course Credits, Hours** | **3 credits / 1 class hours / 4 lab hours** |
| **Course Pre / Co-Requisites** | **ARCH 2430 or CMCE 2410 or EMVC 2340 or department permission** |
| **Catalog Course Description** |  Students learn how to use advanced building simulation tools and techniques to assess the impact of buildings and neighborhoods on thermal comfort and carbon footprint. For high performance buildings, passive and active design strategies are incorporated to find suitable solutions for a climate region. The simulation tools include a computational fluid dynamics (CFD) model and a nodal model.ARCH3550 ‘Building Performance Workshop’ is strongly recommended. |
| **Brief Rationale**Provide a concise summary of why this course is important to the department, school or college. | Urban built environments impact on carbon footprints and climatic conditions for human lives. Therefore, it is critical for architects and designers to be able to assess the performances of their designs. This course will provide necessary knowledge and techniques that are aligned with the needs of current industry.**See attached Course Outline:** |
| **Intent to Submit as Common Core**If this course is intended to fulfill one of the requirements in the common core, then indicate which area. | Not Applicable |
| **Intent to Submit as An Interdisciplinary Course** | Not Applicable |
| **Intent to Submit as a Writing Intensive Course** | Not Applicable |

Please include all appropriate documentation as indicated in the NEW COURSE PROPOSAL Combine all information into a single document that is included in the Curriculum Modification Form.

New York City College of Technology, CUNY

CURRICULUM MODIFICATION PROPOSAL FORM

This form is used for all curriculum modification proposals. See the [Proposal Classification Chart](http://www.300jaystreet.com/college-council/resources/2010/04/2013-10-09-Proposal_Classification_Chart.docx) for information about what types of modifications are major or minor. Completed proposals should be emailed to the Curriculum Committee chair.

|  |  |
| --- | --- |
| **Title of Proposal** | **ARCH 4750 - Advanced Simulation for High Performance Buildings** |
| **Date** | **September 31, 2014** |
| **Major or Minor** | **Major** |
| **Proposer’s Name** | **Jihun Kim** |
| **Department** | **Architectural Technology** |
| **Date of Departmental Meeting in which proposal was approved** | **9/18/2014** |
| **Department Chair Name** | **Shelley Smith** |
| **Department Chair Signature and Date** |  |
| **Academic Dean Name** | **Kevin Hom** |
| **Academic Dean Signature and Date** |  |
| **Brief Description of Proposal**(Describe the modifications contained within this proposal in a succinct summary. More detailed content will be provided in the proposal body. | Students learn how to use advanced building simulation tools and techniques to assess the impact of buildings and neighborhoods on thermal comfort and carbon footprint. For high performance buildings, passive and active design strategies are incorporated to find suitable solutions for a climate region. The simulation tools include a computational fluid dynamics (CFD) model and a nodal model.ARCH3550 ‘Building Performance Workshop’ is strongly recommended. |
| **Brief Rationale for Proposal**(Provide a concise summary of why this proposed change is important to the department. More detailed content will be provided in the proposal body).  | Urban built environments impact on carbon footprints and climatic conditions for human lives. Therefore, it is critical for architects and designers to be able to assess the performances of their designs. This course will provide necessary knowledge and techniques that are aligned with the needs of current industry.**See attached Course Outline:** |
| **Proposal History**(Please provide history of this proposal: is this a resubmission? An updated version? This may most easily be expressed as a list). | This is a new course proposal.  |

**Chancellors Report**

**Section AIV: New Courses**

**AIV.1. Department Architectural Technology**

**Course Number:** **ARCH 4750**

**Title: Advanced Simulation for High Performance Buildings**

**Hours:** **1** Class Hours, **4** Lab Hours

**Credits:**  **3** Credits

**Prerequisite:** ARCH 2430 or CMCE 2410 or EMVC 2340 or department permission

**Corequisites:**

**Pre- or Corequisites:**

**Course Description**:

Students learn how to use advanced building simulation tools and techniques to assess the impact of buildings and neighborhoods on thermal comfort and carbon footprint. For high performance buildings, passive and active design strategies are incorporated to find suitable solutions for a climate region. The simulation tools include a computational fluid dynamics (CFD) model and a nodal model. ARCH3550 ‘Building Performance Workshop’ is strongly recommended.

**Rationale:**

Urban built environments impact on carbon footprints and climatic conditions for human lives. Therefore, it is critical for architects and designers to be able to assess the performances of their designs. This course will provide necessary knowledge and techniques that are aligned with the needs of current industry.

**Section AIII: Changes in Degree Programs**

**AIII.1. The following revisions are proposed for the Department of Architectural Technology**

**Program: Bachelor of Technology Degree**

**Program Code: 27475**

**Effective Date: Fall 2014**

A change of elective courses

|  |  |
| --- | --- |
| **From** | **TO** |
| BTECH ELECTIVES  | BTECH ELECTIVES |
| ARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHFMGTFMGTFMGTMAT | 355035513570359035913609363136403662369036913900440047094740478047914831489049003620472047801475 | Building Performance Workshop 3Sustainability: History and Practice 3Lighting and Acoustics in Architecture 3Parametric Computation, Materials and Fabrication 3Computer Assisted Architectural Animation 3Integrated Software in the Architectural Office 3Advanced Materials Workshop 3Historic Preservation: Theory and Practice 3Government Regulations and Approvals 3Intermediate Computation and Fabrication 3Advanced Design and Building Information Modeling 3Architecture Study Abroad 3Special Topics in Architecture 3Advanced 3-Dimensional Modeling and Rendering 3Detail and Construction Technologies for Existing Buildings 3Case Studies in Structural Engineering 3Advanced Building Information Modeling and Integrated Project Delivery 3Design to Build 3Computation and Fabrication: Performative Architecture 3Internship in Architectural Technology 3Building Systems I 3Building Systems II 3Programming and Introduction to Space Planning 3Calculus I 4 | ARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCHARCH ARCHARCHARCHARCHARCHFMGTFMGTFMGTMAT | 3550355135703590359136093631364036623690369139004400470947404750478047914831489049003620472047801475 | Building Performance Workshop 3Sustainability: History and Practice 3Lighting and Acoustics in Architecture 3Parametric Computation, Materials and Fabrication 3Computer Assisted Architectural Animation 3Integrated Software in the Architectural Office 3Advanced Materials Workshop 3Historic Preservation: Theory and Practice 3Government Regulations and Approvals 3Intermediate Computation and Fabrication 3Advanced Design and Building Information Modeling 3Architecture Study Abroad 3Special Topics in Architecture 3Advanced 3-Dimensional Modeling and Rendering 3Detail and Construction Technologies for Existing Buildings 3Advanced Simulation for High Performance Buildings 3Case Studies in Structural Engineering 3Advanced Building Information Modeling and Integrated Project Delivery 3Design to Build 3Computation and Fabrication: Performative Architecture 3Internship in Architectural Technology 3Building Systems I 3 Building Systems II 3Programming and Introduction to Space Planning 3Calculus I 4 |

**NEW YORK CITY COLLEGE OF TECHNOLOGY**

**CITY UNIVERSITY OF NEW YORK**

**ARCHITECTURAL TECHNOLOGY DEPARTMENT**

**COURSE OUTLINE**

**ARCH 4750 ADVANCED SIMULATION FOR HIGH PERFORMANCE BUILDINGS**

1 class hours, 4 lab hours, 3 credits

**Course Description:**

Students learn how to use advanced building simulation tools and techniques to assess the impact of buildings and neighborhoods on thermal comfort and carbon footprint. For high performance buildings, passive and active design strategies are incorporated to find suitable solutions for a climate region. The simulation tools include a computational fluid dynamics (CFD) model and a nodal model.

ARCH 3550 ‘Building Performance Workshop’ is strongly recommended.

**Prerequisite:** ARCH 2430 or CMCE 2410 or EMVC 2340 or department permission

**Suggested Text:** B. Kolarevic, and Malkawi, Ali M., eds., 2005. Performative Architecture. Routledge.

Malkawi, Ali M., and Godfried Augenbroe. 2004. Advanced Building Simulation. New York & London: Spon Press.

Hensen, Jan LM, and Roberto Lamberts, eds., 2012. Building performance simulation for design and operation. Routledge.

Anderson, K, 2014. Design Energy Simulation for Architects: Guide to 3D Graphics, Routledge.

**Suggested Reference:** Varies depending upon the subject of the course

**Attendance Policy:** More than two-unexcused absences will affect the final grade of the student.
Two latenesses equal one absence.

**Course requirements**:

May vary depending upon course topics. Students will work on various projects and conduct research as relevant to course material and discussions presented in class. Students will write a series of in-class workshop reports, a midterm project report, and a final project report.

**Grading:**   Participation in class discussions and critiques 5%

 Case study presentation 10%

 In-class workshop report 15%

 Midterm project (presentation and report) 30%

 Final Project (presentation and report) 40%

**Academic Integrity:**

Students and all others who work with information, ideas, texts, images, music, inventions and other intellectual property owe their audience and sources accuracy and honesty in using, crediting and citation of sources. As a community of intellectual and professional workers, the college recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and is punishable by penalties, including failing grades, suspension and expulsion.

**Simulation Tools:**   Climate Consultant 5.4 for regional climate analyses

ANSYS Fluent CFD for building and urban comfort

DesignBuilder Outdoor Nodal Model for urban wind comfort

DesignBuilder CFD for indoor airflow

Rhinoceros for geometric modeling

Microsoft Excel for data analyses

**Sample Required Course Texts and Materials:**

**(Books)**

B. Kolarevic, and Malkawi, Ali M., eds., 2005. Performative Architecture. Routledge.

Malkawi, Ali M., and Godfried Augenbroe. 2004. Advanced Building Simulation. New York & London: Spon Press.

Hensen, Jan LM, and Roberto Lamberts, eds., 2012. Building performance simulation for design and operation. Routledge.

Anderson, K, 2014. Design Energy Simulation for Architects: Guide to 3D Graphics, Routledge.

Ghiaus, C, and F Allard. 2005. Natural ventilation in the urban environment: assessment and design, Buildings, energy, solar technology. London ; Sterling, VA: Earthscan.

DeKay, Mark, and G. Z. Brown, 2013. Sun, wind, and light: Architectural design strategies. John Wiley & Sons.

Allan, Andrew. 2012. Climate and Architecture Torben Dahl (ed.), Routledge, London

La Roche, P. 2011. Carbon-Neutral Architectural Design: CRC Press.

Drexler, Hans. 2012. Holistic housing: concepts, design strategies and processes: Walter de Gruyter.

**(Journals)**

Blocken, B., and J. Carmeliet. 2004. "Pedestrian wind environment around buildings: Literature review and practical examples." Journal of Thermal Envelope and Building Science no. 28 (2):107.

Blocken, B., WD Janssen, and T. van Hooff. 2011. "CFD simulation for pedestrian wind comfort and wind safety in urban areas: General decision framework and case study for the Eindhoven University campus." Environmental Modelling & Software.

Zimmermann, M., and E.M. Forschungsanstalt. 2003. Handbook of the passive cooling (Handbuch der passiven Khlung): Fraunhofer IRB Verl.

Chen, Q. and J. Srebric, Application of CFD tools for indoor and outdoor environment design. International Journal on Architectural Science, 2000. 1(1): p. 14-29.

CIBSE, G.F. 2004. "Energy Efficiency in Buildings." Chartered Institution of Building Services Engineers.

Littlefair, P., M. Santamouris, S. Alvarez, A. Dupagne, D. Hall, J. Teller, J.F. Coronel, and N. Papanikolaou. 2000. Environmental site layout planning: solar access, microclimate and passive cooling in urban areas: CRC.

Ratti, C., D. Raydan, and K. Steemers. 2003. "Building form and environmental performance: archetypes, analysis and an arid climate." Energy and Buildings no. 35 (1):49-59.

Santamouris, M. 2001. "Heat-island effect." Energy and Climate Change in the Urban Built Environment. Earthscan, London:48-68.

Steemers, K., N. Baker, D. Crowther, J. Dubiel, M. Nikolopoulou, and C. Ratti. 1997. "City texture and microclimate." Urban Design Studies no. 3:25-50.

Zhai, Z. 2006. "Application of computational fluid dynamics in building design: aspects and trends." Indoor and built environment no. 15 (4):305-313.

Nikolopoulou, M. and S. Lykoudis, Thermal comfort in outdoor urban spaces: analysis across different European countries. Building and Environment, 2006. 41(11): p. 1455-1470.

|  |
| --- |
| **General Education Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this course the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. Gain **Knowledge** on integrated design strategies by precedent research and by building physics
 | 1. **Review and assess** student reports in written, graphic, and oral formats.
 |
| 1. Develop **Analytic skills** to quantitatively evaluate building performances
 | 1. **Judge** the student’s ability to integrate individual/group work through peer and juried review of student presentation.
 |
| 1. Learn **Data Visualization** to communicate ideas and analyses through oral, graphic, and written media
 | 1. **Evaluate** project reports and presentation, with regards to succinctness
 |

|  |
| --- |
| **Course Intended Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this course the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. **Demonstrate** knowledge of passive design strategies and **Strategize** the applicability for a certain climate
 | 1. **Appraise** the quality of critical thinking and contributions to discussions during oral and graphic presentations.
 |
| 1. **Demonstrate** information literacy skills
 | 1. **Evaluate** student research ability on precedent research by written and graphic materials
 |
| 1. **Analyze** available solar radiation on building and urban neighborhood scales
 | 1. **Judge** students abilities to apply building simulation tools
 |
| 1. **Assess** the impact of architectural design and construction on individual comfort, energy consumption.
 | 1. **Rate** the ability to understand the analytical research, aligned with precedent building researches
 |
| 1. **Apply** building performance simulation with regards to natural ventilation and urban wind condition
 | 1. **Score** the ability apply the simulation tools and techniques to group or individual projects
 |
| 1. **Communicate** effectively through presentations to the class using written oral and graphic media.
 | 1. **Evaluate** the students’ ability to effectively present and communicate what is learned on a given subject.
 |
| 1. **Synthesize** and **apply** what is learned to solve problems and to complete assignments given in the class.
 | 1. **Score** the students ability to synthesize apply what is learned to solve problems assigned in the class through grading of assignments.
 |
| 1. **Develop** and **enhance** design intuition to evaluate various design alternatives toward high performance
 | 1. **Appraise** the ability to relate the design intervention to performance matrices in the midterm and final project
 |

**Weekly Course Outline:**While the specific details of each section will differ all courses will follow this basic outline:

**Introduction to Course Topic and Focus**
Introduction of the topic and in-class lectures that provide a strong foundation for the research and investigation that will occur during the semester. Appropriated methodologies is overviewed to assess various design strategies with precedent building examples. Focus is on passive design that can reduce energy demands while creating comfortable environment for occupants. Students choose an existing building for case study report, which will be the used in CFD workshop.

**Week 1** Lecture on understanding of advanced building simulations for high performance buildings

Role of heat and airflow in the built environment

Building simulation

Building science, simulation, and design

Main simulation domains: Thermal, Daylight, CFD

Advanced Simulation

High performance buildings

Sustainable design of buildings and neighborhoods

Climate zones and regional design

Passive, active, and integrated design strategies

Design Natural ventilation, contaminant removal, urban pedestrian discomfort, and wind pressure on skyscrapers, urban heat island

Survey on ‘Building and its impact on climate’

Assignment 1 - Case study of a high performance building(s) in MS PowerPoint file format

**Week 2** Lecture on climate and buildings

How we feel comfortable

 In buildings: temperature and humidity

 In urban microclimates: temperature, radiation, and wind speed

Other matrices: visual, acoustic comfort

Workshop on climate analysis with ClimateConsultant

Determine boundary conditions for urban scale wind analysis

Understanding Psychrometric charts

General climatic design strategies

Student presentation of case study report

Assignment 2 - Workshop report on boundary condition decision for students’ case study report

**2D CFD Workshop for Building Design**

With CFD simulation, assessment process is explained step by step from geometrical modeling to setting up computational meshing and simulation. Students learn two dimensional CFD with its methods and justifications, while applying boundary conditions previous assignment. The building(s) of student’s precedent research will be used for simulation, analyses and optimizations for midterm and final project.

**Week 3**  Workshop on two dimensional CFD for indoor natural ventilation

 Boundary condition from ClimateConsultant

 Methodology justifications for incremental design studies

 Geometry modeling with Rhino

 2D sectional studies in class and 2D plan studies for assignment

 CFD (Meshing, CFD settings, Convergences)

 Mid-term project overview

**Week 4** Workshop on numerical analyses and visualization

Airflow matrices in buildings

2D Vector and path lines

Use of Microsoft Excel for result analyses

In-class technical assistant for assignment

**Week 5** Sketch CFD simulation of case study buildings

 Building data collection, design strategies, analyses, sketch airflow analyses

 Critical section/plan decision for simulation preparation

**Week 6** Student presentation simulation result analysis

 Strategize how to optimize a building

Geometrical operations (applications)

Comparison of various design options

**Week 7** Midterm project report – Design optimization for natural ventilation

**3D CFD Workshop for Urban Design**

With 3D CFD simulation, assessment process is explained step by step from geometrical modeling to setting up computational meshing and simulation. The urban contexts of the students’ case study are used to understand their impact on wind and thermal environments. The wind condition around the building will be analyzed and used to validate the 2D CFD boundary condition. Optimizing the urban condition for pedestrian environmental comforts is the final project.

**Week 8** Workshop on three dimensional CFD for urban comfort

Methodology justifications for incremental design studies

Geometry modeling with Rhino

Material settings

CFD (Meshing, CFD settings, Convergences)

Final project overview

**Week 9** Workshop on advanced visualizations

 Intro to ANSYS CFD Post

 3D path lines, vector

 Use of Microsoft Excel for result analyses

**Week 10** Workshop on Design operations and optimizations

Passive and active design operations

In-class technical assistances

**Week 11** Draft CFD simulation with urban context of midterm project

 Urban data collection, sketch airflow analyses

 Geometries and meshing preparation.

 Final project consultation on optimization

**Week 12** Lecture on outdoor nodal models

 Capacities and limitations for year-long prediction

 Cross validation

 Integrating CFD and outdoor nodal model

Workshop on Outdoor Nodal Model - 1

Same urban context used in 3D CFD simulation

**Week 13** Workshop on Outdoor Nodal Model - 2

Result comparison with 3D CFD simulation

Introduction to DesignBuilder CFD for indoor airflow

**Week 14** Student presentation of final project presentation

Final project report consultation

**Week 15** Final project report – Urban Design Optimization for Wind and Thermal Comfort

**LIBRARY RESOURCES & INFORMATION LITERACY: MAJOR CURRICULUM MODIFICATION**

Please complete for **all** major curriculum modifications. This information will assist the library in planning for new acquisitions; it will not affect curriculum proposals either positively or negatively.

Consult with library faculty subject selectors (<http://cityte.ch/dir>) **3 weeks in advance** when planning course proposals to ensure enough time to allocate budgets if materials need to be purchased.

**Course proposer:** please complete boxes 1-4. **Library faculty subject selector:** please complete box 5.

|  |  |  |
| --- | --- | --- |
| **1** | **Title of proposal**Advanced Simulation for High Performance Buildings | **Department/Program**Architectural Technology |
|  | **Proposed by** (include email & phone)Jihun Kim JKim@CityTech.Cuny.Edu 718-260-5998 | **Expected date course(s) will be offered** Fall 2015**# of students** 16-25 |

|  |  |
| --- | --- |
| **2** | **Are City Tech library resources sufficient for course assignments? Please elaborate.*****Book purchases are desired for the following:***1. B. Kolarevic, and Malkawi, Ali M., eds., 2005. Performative Architecture. Routledge.
2. Malkawi, Ali M., and Godfried Augenbroe. 2004. Advanced Building Simulation. New York & London: Spon Press.
3. Hensen, Jan LM, and Roberto Lamberts, eds., 2012. Building performance simulation for design and operation. Routledge.
4. Anderson, K, 2014. Design Energy Simulation for Architects: Guide to 3D Graphics, Routledge.
5. Ghiaus, C, and F Allard. 2005. Natural ventilation in the urban environment: assessment and design, Buildings, energy, solar technology. London ; Sterling, VA: Earthscan.
6. DeKay, Mark, and G. Z. Brown, 2013. Sun, wind, and light: Architectural design strategies. John Wiley & Sons.
7. Allan, Andrew. 2012. Climate and Architecture Torben Dahl (ed.), Routledge, London
8. La Roche, P. 2011. Carbon-Neutral Architectural Design: CRC Press.
9. Drexler, Hans. 2012. Holistic housing: concepts, design strategies and processes: Walter de Gruyter.
 |

|  |  |
| --- | --- |
| **3** | **Are additional resources needed for course assignments? Please provide details about format of resources (e.g., ebooks, journals, DVDs, etc.), author, title, publisher, edition, date, and price.*****The journals, listed in course outline, can be acquired in digital format.*** |

|  |  |
| --- | --- |
| **4** | **Library faculty focus on strengthening students' information literacy skills in finding, evaluating, and ethically using information. We can collaborate on developing assignments and offer customized information literacy instruction and research guides for your course.****Do you plan to consult with the library faculty subject specialist for your area? Please elaborate.*****Yes - the semester prior to the running of any section.***  |

|  |  |
| --- | --- |
| **5** | **Library Faculty Subject Selector\_\_\_\_\_\_\_\_\_\_Prof. Ian Beilin\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**NEW YORK CITY COLLEGE OF TECHNOLOGY**

**CITY UNIVERSITY OF NEW YORK**

**ARCHITECTURAL TECHNOLOGY DEPARTMENT**

***SAMPLE ASSIGNMENT #1***

**ARCH 4750 Advanced Simulation for High Performance Buildings**

**Assignment Name:  Precedent Research of Architectural Examples on Passive Design**

**Context:**

Sample assignments given during the first phase of the course (Week 1 - Week 2) during which the student is introduced to the topics and completes precedent studies and develops an understanding of appropriate design research methodologies.

**Description:**

In response to in-class lecture, identify, research and present three (3) appropriate precedent case studies that are designed for passively building conditioning with regards to occupant’s thermal comfort. As part of the research and presentation compare and contrast each precedent study and relate your presentation to critical observations from your class lecture. Investigate and make diagrams of main building components that regulate flow of heat and air.

Your work is to be formatted for both print (11 x 17 landscape) and media presentation (PowerPoint / PDF). All referenced sources must be cited.

|  |
| --- |
| **General Education Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this assignment the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. Gain **Knowledge** on the course topic through lectures and Develop **Analytic skill** to quantitatively evaluate building performances
 | 1. **Review and assess** student reports in written, graphic, and oral formats.
 |
| **Course Intended Learning Outcomes / Assessment Methods** |
| 1. **Demonstrate** the ability to investigate into a lecture topics and conduct precedent research so as to contribute to the growth of knowledge.
 | 1. **Evaluate** student research abilities through review of blog postings, written and graphic materials & presentations
 |
| 1. **Communicate** effectively through presentations to the class using written oral and graphic media.
 | 1. **Judge** the students’ ability to effectively present and communicate what is learned on a given subject.
 |
| 1. **Communicate** effectively using a vocabulary appropriate to the subject matter.
 | 1. **Assess** the students’ use of professional vocabulary during oral and written presentations.
 |

**Process:**

1. Select a focus of your precedent studies.
2. Conduct research and identify three (3) relevant case studies.
3. Present your research in-class and post presentation on (OpenLab/blackboard) as required.

**References:**

1. Identify all sources and references.

***SAMPLE ASSIGNMENT #2***

**ARCH 4750 Advanced Simulation for High Performance Buildings**

**Assignment Name:  Performance Evaluation of Architectural Examples on Passive Design**

**Context:**

With student’s precedent research (Week 1 – Week 2), theory and application on passive design techniques are gained. Performance assessment techniques is familiar to student with computational building simulation tools during lab hours (Week 3 – Week 5).

**Description:**

In conjunction with the first assignment, students choose one of existing building examples in order to apply building simulation and assessment techniques. Relate the simulation result to the comfort matrices from the lectures. As part of the research, discuss the effectiveness of design/construction methods.

Your work is to be formatted for both print (11 x 17 landscape) and media presentation (PowerPoint / PDF / Moviemaker). All referenced sources must be sited.

|  |
| --- |
|  **General Education Learning Outcomes / Assessment Methods** |
| **Learning Outcomes** | **Assessment Methods** |
| Upon successful completion of this assignment the student shall be able to: | To evaluate the students’ achievement of the learning objectives, the professor will do the following: |
| 1. Gain **Knowledge** on the course topic through lectures and Develop **Analytic skill** to quantitatively evaluate building performances
 | 1. **Review and assess** student reports in written, graphic, and oral formats.
 |
| 1. **Communicate** effectively through presentations to the class using written oral and graphic media.
 | 1. **Judge** the students’ ability to effectively present and communicate what is learned on a given subject.
 |
| **Course Intended Learning Outcomes / Assessment Methods** |
| 1. **Analyze** available solar radiation on building and urban neighborhood scales
 | 1. **Judge** students abilities to apply building simulation tools
 |
| 1. **Demonstrate** the understanding of the impact of architectural design on individual comforts, and energy consumptions.
 | 1. **Evaluate** the ability to understand the analytical research, aligned with precedent building researches
 |
| 1. **Apply** building performance simulations with regards to natural ventilation and urban wind condition
 | 1. **Score** the ability apply the simulation tools and techniques to group or individual projects
 |

**Process:**

1. Select one of the buildings in precedent research
2. Geometrically model the main building components that are designed to regulate heat and airflow
3. Apply simulation tools and techniques to assess the performances
4. Analyze simulation result and compare to the projected outcome in system diagrams in the first assignment
5. Present your research in-class and post presentation on (OpenLab/blackboard) as required.

**References:**

1. Identify all sources and references.