MET CS 682 Information Systems Analysis and Design
2026 Summer 1 Online Course Syllabus

Instructor

Jack Polnar, jpolnar@bu.edu

Course Duration

Start: May 5, 2026
End: June 22, 2026

Course credits

4 credits

Course Description

This course describes modern methods of information system analysis and design for organizations with IT resources. It introduces the discovery process for system feasibility, describes stakeholder analysis, and covers requirements analysis. The course explains use cases and their application to requirements analysis. It covers the management of system analysis projects and risks. “Build vs. buy” trade-offs are discussed. The Unified Modeling Language for specifying object-oriented system designs is discussed. Data flow diagrams and activity models are integrated with the analysis and design coverage. The course covers most of the fundamental system architectures, as well as approaches to detailed design.

Prerequisites: None

Course Learning Objectives

This course is designed to enable you to do the following

- Recognize various types of business systems
- Explain and summarize a proposed systems analysis project
- Recognize various software development process approaches including Rapid Application Development (RAD) and Agile approaches.
- Recognize project management dynamics within software projects
- Understand and apply requirements gathering techniques
- Recognize and apply various architectural and detailed design approaches
- Recognize and apply goals of good system design
- Understand and apply UML models

By reading the lectures and completing the assignments in this course, you will be able to do the following:

- Perform systems analysis:
  - Develop written functional and non-functional requirements
  - Create written use cases and scenarios
  - Develop graphical user interface mock-ups
- Identify how to best implement and manage a project within the Software Development Lifecycle (SDLC) including various Agile methodologies.
- Better predict and deal with risks
- Integrate the use of classes in Object-Orientation
- Relate one class to another through inheritance, aggregation and dependencies
- Create class, sequence, activity, data flow, and state transition UML diagrams
- Understand and apply tradeoffs within design goals
- Construct system architectures and detailed designs

Week-by-Week Topics

Week 1 — Introduction and Process

- Types of Information Systems
- Systems Analysis
- Process
- Introduction to System Analysis Methodology
- Participants in Systems Analysis

Week 2 — The Management of System Analysis

- System Requirements and System Design
- Systems Development Methodologies
  - Structured—Waterfall, Parallel
  - Rapid Application Development (RAD)—Phased, Prototyping, Throwaway Prototyping
  - Agile—Scrum, Extreme Programming (XP), Lean, Kanban, Scaled Agile Framework (SAFe)
- Trade-offs and selecting a suitable development methodology
- Tools of Project Management
  - WBS, Gantt, Software
- Project estimation techniques
  - PERT
  - Variables and factors
  - Agile: Planning Poker
- Managing Scope

    - Scope Creep, timeboxing
- Managing Risks
- Managing Teams
    - Individuals
    - Teams
    - Team Leadership
    - Organization culture and structure

Week 3 — System and Requirements Analysis

- The meaning and sources of requirements
    - Identifying stakeholders
- Requirements gathering strategies and techniques
    - Interview strategies and problem-solving
- Documenting requirements
    - Overview-mission statement
    - Functional and non-functional requirements
    - User stories
    - Use cases
- User interface and interface requirements
    - Principles for user interface design
- The modeling of requirements
    - Introduction to Unified Modeling Language (UML)
    - State transition diagrams
- Methods of organizing requirements - a summary

Week 4 — Modeling with UML

- Classes in UML
    - Entity Classes, Attributes, Methods, Non-Entity Classes
    - Textual Analysis strategies to determine objects
        - Example of extracting classes, attributes and methods from a use case
    - Class relationships in UML
        - Inheritance, Association, Aggregation, Composition, Other Dependencies
    - Class diagrams
    - Detailed sequence diagrams

Week 5 — System Architectures

- Design purposes
- Software frameworks
- More on data flow diagrams
- ATAM Design and Tradeoffs
- Categorizing system architectures

- Component technology

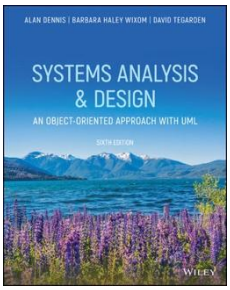
Week 6 — Detailed Design

- Design in the Unified Development Process
- Designing against component interfaces
- Specifying classes and functions for design
- Software reuse
- Detailed sequence diagrams and data flow diagrams
- Standards for detailed design
- Estimating cost of software

Week 7 — Final Exam

Course Materials

Recommended Books



Dennis, Wixom, & Tegarden. (2020). *Systems Analysis and Design: An Object-Oriented Approach with UML* (6th ed.). John Wiley and Sons. ISBN: 978-1119559917.

Welcome To First Day™ Delivery for Your Course

To enhance your learning experience and simplify access to the right materials for your class, your course materials have been integrated directly into your course.

Benefits of The Program

- Exclusive preferred pricing
- Guaranteed the right materials
- Single Sign-On
- Ready to go on day one
- Course materials charge will be placed on your student account
- Option to Opt-Out on the first day of class.

Accessing Your Materials

To access the required materials for your course, click on *Course Materials (Barnes & Noble)* in the left-hand menu in Blackboard. To navigate back to the course, click on the course title at the top left of your Blackboard screen.

Boston University will bill you at the discounted price as a course charge for this course. Please be advised it is NOT recommended that you Opt-Out, as these materials are required by your professor to complete the course. You can choose to Opt-Out on the first day of class, but you will be responsible for purchasing your course materials at the Opt-Out price.

For more information and FAQs visit Barnes and Noble at Boston University customer care page.

For students who opt-out an eBook may be available at Vitalsource.com or through Amazon. Students may also use the 13th edition.

Other Resources

- For definitions and terms, and for pointing you to references, Wikipedia can sometimes be useful. However, remember that information at Wikipedia is erratically curated, and entries have been manipulated by a variety of people for a variety of reasons. You are free to use Wikipedia as a starting point and as a source of pointers to higher-quality information, however, avoid citing Wikipedia (or similar sources that have not been reviewed professionally for veracity) as authorities.
- The UML specifications are at http://uml.org/ (but you will find them very dense and formal indeed).
- You have the option of using Visio or Lucidchart in this course for UML. However, you are free to use other tools if you wish.

Module 1 Study Guide and Deliverables (May 5 – May 11)

Readings:

Primary Reading for Module 1:

The following readings should be completed after reading the module parts that they pertain to.

- Pages 1-4: Introduction, Typical Systems Analyst Roles and Skills
- Pages 4-6: The Systems Development Lifecycle
- Pages 43-44: Project Identification
- Pages 53-55: Project Selection

Secondary Reading for Module 1
The following readings are not required; however, they provide additional depth and examples for concepts in this module.

- Pages 424-427: Ubiquitous Computing and the Internet of Things
- Pages 138-148: Business Process Modeling with Activity Diagrams

Assignments

- Draft Assignment 1 due **Sunday, May 10** at 6:00 AM ET
- Assignment 1 due **Thursday, May 14** at 6:00 PM ET

Optional Assessments:

- Crediting Sources Tutorial Self-Assessment due **Saturday, May 9** at 6:00 PM ET
- AI Usage Quiz due **Saturday, May 9** at 6:00 PM ET

Live Classrooms:

- **Tuesday, May 5** from 8:00-10:00 PM ET - Class Lecture
- **Wednesday, May 6** from 8:00-9:00 PM ET - Assignment Preview
- Live Office: **Monday, May 11** at 8:00 PM ET

Module 2 Study Guide and Deliverables (May 12 – May 18)

Readings:

Primary Reading for Module 2 Part 1
The following readings should be completed after reading the module parts that they pertain to.

- Pages 7-17: Systems Development Methodologies

Primary Reading for Module 2 Part 2
The following readings should be completed after reading the module parts that they pertain to.

- Pages 41-43: Introduction to Project Management
- Pages 55-60: Traditional Project Management Tools
- Pages 65-74: Creating and Managing the Workplan (read Managing Scope, Timeboxing, Managing Risk Agile Alternatives to Iterative Workplans-Kanban)

- Pages 74-80: Staffing the Project (focus on Characteristics of a Jelled Team, Staffing Plan, Motivation, Handling Conflict)

Secondary Reading for Module 2 Part 1
The following readings are not required, however provide additional depth and examples for concepts in this module.

- Pages 275-280: Design Strategies (Custom Development, Packaged Software, Outsourcing, Selecting a Design Strategy)
- Scrum Guide (18 pages)
- Scaled Agile Framework White Paper (28 pages)
- Please see Appendix Sections for additional suggested readings.

Secondary Reading for Module 2 Part 2
The following readings are not required; however, they provide additional depth and examples for concepts in this module.

- Pages 45-53: Feasibility Analysis
- Pages 83-85: CASE Tools, Standards, Documentation
- Pages 453-457: Managing Programming

Assignments:

- Draft Assignment 2 due **Sunday, May 17** at 6:00 AM ET
- Assignment 2 due **Thursday, May 21** at 6:00 PM ET

Live Classrooms:

- **Tuesday, May 12** from 8:00-10:00 PM ET - Class Lecture
- **Wednesday, May 13** from 8:00-9:00 PM ET - Assignment Preview
- Live Office: **Monday, May 18** at 8:00 PM ET

Module 3 Study Guide and Deliverables (May 19 – May 25)

Readings:

Primary Reading for Module 3:
The following readings should be completed after reading the module parts that they pertain to.

Meaning and sources of requirements and requirements gathering strategies and techniques

- Pages 96-98: Requirements Determination (read "Defining a Requirement")
- Pages 119-120: User Stories

User Interface Requirements

- Pages 365-369: Principles for User Interface Design

The Modeling of Requirements

- Pages 26-28: The Unified Modeling Language

Secondary Reading for Module 3
The following readings are not required; however, they provide additional depth and examples for concepts in this module.

Requirements Analysis

- Pages 99-115: Requirements Analysis Approaches, Requirements—Gathering Techniques

Non-Functional Requirements

- Pages 434-436: Hardware and System Software Specifications
- Pages 436-443: Non-functional Requirements and Physical Architecture Layer Design
- Pages 404: Non-functional Requirements and Human-Computer Interaction Layer Design
- Pages 344-345: Non-functional Requirements and Data Management Layer Design

Use Cases *(Note: The methodology in the textbook differs slightly from what is provided in the module)*

- Pages 134-135: Identifying Major Use Cases
- Pages 148-160: Business Process Documentation with Use Cases and User Case Descriptions

Human-Computer Interaction Design

- Pages 364-407: Chapter 10 Human-Computer Interaction Layer Design

State Machines *(Note: The textbook introduces state machine diagraming through an object-oriented approach, which is covered in the next module.)*

- Pages 232-239: Behavioral State Machines
- Pages 239-241: Examples of Creating Behavioral State Machine Diagrams

- Pages 376-377: Windows Navigation Diagrams (MND), which are based on state transition diagrams.
- Pages 371-373: Navigation Structure Design
- OMG Unified Modeling Language Specification (opens PDF) from OMG v 2.5

Assignments:

- Draft Assignment 3 due **Sunday, May 24** at 6:00 AM ET
- Assignment 3 due **Thursday, May 28** at 6:00 PM ET

Live Classrooms:

- **Wednesday, May 20** from 8:00-10:30 PM ET – Class Lecture and Assignment Preview
- Live Office: **Monday, May 25** at 8:00 PM ET

Module 4 Study Guide and Deliverables (May 26 – June 1)

Readings:

Primary Reading for Module 4:

The following readings should be completed after the module parts that they pertain to.

- Pages 32-39: Basic Characteristics of Object-Oriented Systems
- Pages 169-173: Structural Modeling: (read "Introduction," "Structural Models," and "Object Identification"—through "Textual Analysis" only)
- Pages 176-190: Class Diagrams
- Pages 215-224: Sequence Diagrams

Secondary Reading for Module 4

The following readings are not required; however, they provide additional depth and examples for concepts in this module.

- Pages 224-229: Examples of Building Sequence Diagrams
- Pages 373: 2nd Paragraph on Stereotypes

Supplementary Reference

- OMG Unified Modeling Language Specification (opens PDF) from OMG v 2.5

Assignments:

- Draft Assignment 4 due **Sunday, May 31** at 6:00 AM ET
- Assignment 4 due **Thursday, June 4** at 6:00 PM ET

Live Classrooms:

- **Tuesday, May 26** from 8:00-10:00 PM ET - Class Lecture
- **Wednesday, May 27** from 8:00-9:00 PM ET - Assignment Preview
- Live Office: **Monday, June 1** at 8:00 PM ET

Module 5 Study Guide and Deliverables (June 2 – June 8)

Readings:

Primary Reading for Module 5:
The following readings should be completed after reading the module parts that they pertain to.

- Pages 263-270: Packages and Package Diagrams
- Pages 270-274: Design Criteria (read "Coupling," "Cohesion")

Secondary Reading for Module 5
The following readings are not required; however, they provide additional depth and examples for concepts in this module.

- Pages 289-300: Object Design Activities
- Pages 414-421: Physical Architecture Layer Design
- Pages 422-428: Cloud Computing, Ubiquitous Computing and the Internet of Things, Green IT

The *Encounter* video game case study will be referenced in this module.

Assignments:

- Draft Assignment 5 due **Sunday, June 7** at 6:00 AM ET
- Assignment 5 due **Thursday, June 11** at 6:00 PM ET

Live Classrooms:

- **Tuesday, June 2** from 8:00-10:00 PM ET - Class Lecture
- **Wednesday, June 3** from 8:00-9:00 PM ET - Assignment Preview
- Live Office: **Monday, June 8** at 8:00 PM ET

Module 6 Study Guide and Deliverables

(June 9 – June 15)

Readings:

Primary Reading for Module 6:

The following readings should be completed after reading the module parts that they pertain to.

- Pages 310-314: Method Specification
- Pages 60-65: Project Effort Estimation

Secondary Reading for Module 6:

The following readings are not required; however, they provide additional depth and examples for concepts in this module.

- Pages 138-148: Business Process Modeling with Activity Diagrams
- Techniques for Estimating – Planning Poker (opens PDF), Mountaingoatsoftware (12 pages)

The *Encounter* video game case study will be referenced in this module.

Assignments:

- Draft Assignment 6 due **Sunday, June 14** at 6:00 AM ET
- Assignment 6 due **Thursday, June 18** at 6:00 PM ET

Live Classrooms:

- **Tuesday, June 9** from 8:00-10:00 PM ET - Class Lecture
- **Wednesday, June 10** from 8:00-9:00 PM ET - Assignment Preview
- Live Office: **Monday, June 15** at 8:00 PM ET

Course Evaluation:

Please complete the course evaluation once you receive an email or Blackboard notification indicating the evaluation is open. Your feedback is important to MET, as it helps us make improvements to the program and the course for future students.

Final Exam

The Final Exam is a proctored exam available from **Wednesday, June 17, at 6:00 AM ET to Saturday, June 20, at 11:59 PM ET**.

The Computer Science department requires that all final exams be administered using an online proctoring service, which you will access via your course in Blackboard. In order to take the exam, you are required to have a working computer, webcam, speakers, and microphone that

meet the proctoring service's system requirements. A detailed list of those requirements can be found in the Proctored Exam Information module located on the course home page. Additional information regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your proctored exam session within the defined exam window.

Microsoft Azure Dev Tools for Teaching

In this class you will use **Visio Professional** or **Lucid Chart** to create UML diagrams (although you may use another tool with your instructor's permission).

Metropolitan College is a member of Azure Dev Tools for Teaching (formerly Microsoft Imagine), a Microsoft program that supports technical education by providing access to most Microsoft software for learning, teaching, and research purposes. Our membership allows faculty and students currently enrolled in MET courses to obtain certain Microsoft products free of charge. All MET students are granted access to download the software for the duration of their study at MET College.

FAQ and basic information are at Microsoft Azure Dev Tools for Teaching.

If you choose to use Lucidchart we suggest that you access it using your BU Google Apps account. Information can be found here to set up your Google Apps account: http://www.bu.edu/tech/support/google/

Evaluation of Students and Grading

Absorbing and creating IT perspectives will be expected of all students in the class.

Note: To help the teaching team clarify points in students' work, grades are subject to students possibly being required to answer questions orally about the work they have submitted. Reasonable notice will be given.

Draft Assignments

These questions are similar to what you will find on the same week's assignments and are intended to help you with the associated subject matter so that you can get feedback before your assignment for that week is due. We encourage you to start the draft assignment at the beginning of each week so that you are familiar with its question, you can work on it through the week up until the draft assignment deadline.

Weekly Assignments/Term Project

Most of the content of the course will be explored through weekly assignments that study actual cases or encourage you to extrapolate from your own organizations and experiences. These are counted equally.

Final Exam

There will be a proctored Final Exam in this course using a proctor service. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment.

The exam will be three hours long and will be similar in format to the weekly homework assignments. This provides you with the opportunity to show what you have learned from reading the material, participating in the discussions, and doing the homework.

Grade Computations

The course grade will be computed from the following:

- Assignments: 60%
- Draft Assignments: 6%
- Proctored Final Exam: 34%

Rubric

Weekly Assignments
The weekly assignments are graded according to the evaluation matrices on the pages that follow. These are averaged using the following scale: A+=100, A=95, A-=90, B+=87, B=85, B-=80, C+=77, C=75, C-=70, D+=67, and D=65. When a paper is considered to be perfect, a score of 100 can be entered.

To get an A grade for the course, your weighted average should be > 93. For an A-, = 90, B+ = 87, B > 83, B- = 80, etc.

By the time grades are submitted to the registrar, the class average will be approximately 87 (B+).

The Draft Assignments are graded as follows:

- **1 – On Track:** Strong draft with only a few minor issues (trending B+ or higher)
- **0.75 – Mostly On Track:** Very good progress with some gaps or revisions needed (trending B– to B).
- **0.5 – Partially On Track:** Some key elements missing or unclear (trending below B–).
- **0 – Off Track:** Not passing; major issues present (trending toward C or below).

Note: An "A" grade at Boston University is reserved for excellent work. If you are given an A, you are to be especially congratulated. The university officially designates good work as deserving of a "B" and we reward good work with a "B" accordingly. It is our obligation to tell you as far as we can what would improve your work. (That can sometimes be hard if you receive an A, of course.) If you don't see such feedback, please remind your facilitator about it. Grades are an excellent motivator, but they are only the means to an end rather than ends in themselves. The average grade in graduate courses is usually expected to be a B+. If the course average turns out to be less than this at the end of the term, and the class performance is not less than average, I am able to elevate some grades that fall on borderlines.

Expectations

We recognize that emergencies occur in professional and personal lives. If one occurs that prevents your completion of homework by a deadline, please make this plan to your facilitator. This must be done in advance of the deadline (unless the emergency makes this impossible, of course) and should be accompanied by particulars that back it up. Additional documentation may be requested.

Penalties for Late Work (Assignments)

Assignments

- 2 days late 10% grade reduction (Handed in after Friday 6 AM)
- 4 days or more late 50% grade reduction (Handed in Sunday 6 AM or after)

Drafts

- no credit past 1 day late - however, feedback will be provided

Grading Criteria for Homework

Unless otherwise specified, homework will be evaluated according to the following criteria.

Criterion	A (Excellent)	A- (Strong)	B/B+ (Good)	C+ / B- (Adequate)	C (Developing)	F / D (Insufficient)
Technical Mastery: Technical content is accurate and shows what you have learned technically. (40%)	**Deep and precise understanding** of technical material; applies, critiques, and extends methods **significantly beyond** what is required.	**Strong** grasp of technical material with clear, accurate application and reasoning.	**Good** understanding of most technical concepts; occasional minor gaps or misapplications.	**Reasonable understanding** but **inconsistent accuracy** or limited synthesis across topics.	**Basic understanding with noticeable gaps**; limited ability to apply or explain concepts.	Minimal or no understanding of technical material; incomplete or inaccurate work.
Depth, Relevance and thoroughness of coverage (35%)	**Exceptionally** thorough and analytically rich coverage; integrates multiple perspectives **significantly beyond** what is required.	**Thorough coverage** of major issues with sound reasoning and clear connections.	**Good** coverage of key topics; shows understanding but lacks deeper analysis.	Covers core issues but **lacks consistency or sufficient depth**.	**Partial coverage or weak focus**; minimal analysis or reflection.	Little or no relevant content; lacks understanding of major issues.
Use of AI, Clarity in presentation (25%)	AI is used strategically to extend original thinking **significantly beyond** what is required; work is clear, coherent, and demonstrates independent insight.	AI **enhances** and **complements student ideas**; presentation is clear and well-organized. **Student ideas are present and generally easy to identify.**	AI use is **mostly appropriate**; presentation is clear. Student thinking is evident but **sometimes hard to separate from AI** contributions.	AI occasionally dominates or is unevenly applied **overshadowing student ideas**; organization or clarity is inconsistent.	**AI use lacks acknowledgment** or clear purpose; **student input is limited** and ideas are unclear or lack originality	Work is largely AI-generated with minimal or no student input.
At the master's level, AI tools should enhance — not replace — your reasoning. "Significantly beyond what is required" reflects original synthesis and analytical depth supported clearly by appropriate AI use.						

Use of Artificial Intelligence (AI) Tools

Students may use AI tools (such as ChatGPT or similar systems) as support for learning and development, including assistance with understanding concepts, refining logic, or improving code and presentation. Any use of AI must be clearly disclosed in the submission, in plain language, explaining how the tool was used and how the student's own thinking, decisions, or modifications are reflected in the final work. Formal citation styles are not required.

AI use is explicitly evaluated as part of the course rubric. Strong work demonstrates that AI tools enhance the student's original reasoning, clarity, and technical understanding, while weak work relies on AI output with little evidence of independent thought or comprehension. Students are fully responsible for the accuracy and correctness of all submitted work. Undisclosed AI use, or overreliance on AI that replaces rather than supports learning, will negatively impact evaluation and may constitute an academic integrity violation.

Academic Conduct Code

Academic Integrity: Plagiarism is the passing off of another's words or ideas as your own, and it is a serious academic offense. Plagiarism and cheating also defeat the purpose of getting an education. Plagiarism and cheating cases will be handled in accordance with the disciplinary procedures described in the College of Arts and Sciences Academic Conduct Code. You are expected to know and abide by the code, which can be read online: Academic Conduct Code. Penalties range from failing an assignment or course (first offense) to suspension or expulsion from BU. If in doubt, cite your source. If you have any questions about academic integrity, please ask your instructor.

Incidents of academic misconduct will be reported to the Academic Conduct Committee (ACC). The ACC may suspend/expel students found guilty of misconduct.

Important Message on Final Exams

Dear Boston University Computer Science Online Student,

As part of our ongoing efforts to maintain the high academic standard of all Boston University programs, including our online MSCIS degree program, the Computer Science Department at Boston University's Metropolitan College requires that each of the online courses includes a proctored final examination.

By requiring proctored finals, we are ensuring the excellence and fairness of our program. The final exam is administered online.

Specific information regarding final-exam scheduling will be provided approximately two weeks into the course. This early notification is being given so that you will have enough time to plan for where you will take the final exam.

I know that you recognize the value of your Boston University degree and that you will support the efforts of the University to maintain the highest standards in our online degree program.

Thank you very much for your support with this important issue.

Regards,

Professor Lou Chitkushev, Ph.D.

Associate Dean for Academic Affairs

Boston University Metropolitan College

Disability and Access Services

In accordance with university policy, every effort will be made to accommodate students with respect to speech, hearing, vision, or other disabilities. Any student who may need an accommodation for a documented disability should contact Disability and Access Services at 617-353-3658 or at access@bu.edu for review and approval of accommodation requests.

Once a student receives their accommodation letter, they must send it to their instructor and/or facilitator each semester. They must also send a copy to their Faculty & Student Support Administrator, who may need to update the course settings to ensure accommodation is in place. Accommodation cannot be implemented if the students do not send their letters.