1. **Course Number and Course Title:**

   CMP 257 – Web Application Programming

2. **Credit Hours:**

   3 – 3 – 4

3. **Prerequisites and/or Co-Requisites:**

   Prerequisite: CMP 220 Programming II
   Co-requisites: CMP 257L

4. **Name and Contact Information of Instructor:**

   Name: Dr. Dana Dghaym
   Email: ddghaym@aus.edu
   Office: ESB 2067
   Phone: 06 515 4991
   Office Hours: Posted on office door and iLearn; also by appointment

5. **Course Description (Catalog Description):**

   Introduces object-oriented programming in Java, including key features such as interfaces, multi-threading, and exception handling. Covers the basic principles of database application development, including entity-relationship models and query commands. Covers the design and implementation of interactive web-based Graphical User Interfaces (GUI) using HTML, CSS, web GUI frameworks such as Bootstrap, and JavaScript. Covers the basics of using tools such as JSF to build web applications by assembling reusable GUI components.

6. **Textbook and other Supplemental Material:**

   Textbook:
   - Y Daniel Liang, Introduction to Java Programming and Data Structures, 13th ed., Pearson, 2024.

   Other supplemental material:
   - D. Eck, Introduction to Programming Using Java, 8th ed., Eck 2021. Online at: http://math.hws.edu/javanotes/
   - P.J. Deitel, H. Deitel, Java How to Program, Early Objects, 11th ed., Pearson, 2021.
   - L. Sanchez, Web Programming with HTML, CSS, Bootstrap, JavaScript, React.JS, PHP, and MySQL, 3rd ed., Amazon Digital Services 2022.
   - W3 Schools tutorials. Online at: https://www.w3schools.com/

7. **Course Learning Outcomes:**

   Upon completion of the course, students will be able to:
   1. Create Java programs using object-oriented programming concepts.
   2. Develop multithreaded programs.
   3. Apply SQL to create a relational database schema based on entity-relationship models
   4. Write SQL statements to create queries and modify database schemas.
   5. Design static web-based Graphical User Interfaces using HTML and CSS.
   6. Build interactive and dynamic web interfaces using tools such as Bootstrap and JavaScript.
   7. Build simple server-side web applications using tools such as JSF.

8. Teaching and Learning Methodologies:

Methods include lectures, problem-based learning, class discussions, and group work, as well as laboratory sessions. Students learning is assessed via in-class quizzes, exams, homework, and programming assignments/projects.

9. Course Topics and Schedule:

Topic/Activity	Weeks
Introduction to internet basics and web programming	Week #1
Creating web pages using HTML and Cascading Style Sheets (CSS)	Week #2
Designing interactive webpages using JavaScript and Bootstrap	Week #3
Introduction to Java programming	Week #4
Java strings, arrays, ArrayList	Week #5
Java classes and objects, OO design	Week #6
Java inheritance, polymorphism, abstract classes, interfaces	Week #7
File IO and Exceptions	Week #8
Multi-threading basics, concurrency, thread synchronization	Week #9
Building web application using Java	Week #10
Introduction to database systems, entity-relationship (ER) diagram modeling	Week #11
Mapping ER diagrams into relational schemas	Week #12
Introduction to SQL data definition and data manipulation commands	Week #13
Integration of database with web application & Project Demo	Week #14
Final Exam	Week #15

10. Schedule of Laboratory and other Non-Lecture Sessions:

Assignment	Due Date (tentative)
Lab 1 – Building web-based interfaces using HTML	Week #2
Lab 2 – Designing webpages using CSS	Week #3
Lab 3 – Introduction to Bootstrap	Week #4
Lab 4 – Client-side JavaScript	Week #5
Lab 5 – Java introduction and Object-Oriented Programming	Week #6
Lab 6 – Java programming, types, arrays, ArrayList	Week #7
Lab 7 – Inheritance in Java	Week #8
Lab 8 – Java abstract classes, interfaces	Week #9
Lab 9 – Java Hierarchy and File I/O	Week #10
Lab 10 – Java Threads and Servlets	Week #11
Lab 11 – Project Servlet Integration	Week #12
Lab 12 – Preparing a full stack web application	Week #13
Lab 13 – Project Help	Week #14

Project:

Students will work in teams of 3 to 4 students to develop a web application of their choice. The web application cannot be used to claim credit in other courses or senior design projects. The web application must be approved by the professor by email or in person. The application shall include the following features: A dynamic web-based graphical user interface, Use Java to develop a robust back-end, and support the application's data requirement using a relational

database. The students will submit a working application with a report. The assessment is based on the above submissions and a demo presentation.

11. Out-of-Class Assignments with Due Dates:

Assignment	Due Date (tentative)
Homework 1 – Web-based Graphical User Interfaces	Week #4
Homework 2 – Java Programming Basics	Week #8
Homework 3 – Advanced Java Concepts & Database programming	Week #12
Course project – Build a web application and GUI	Week #14

12. Student Evaluation:

Assessment	Weight	Due Date (tentative)
Quizzes (x2)	5%	Week 5 & Week 10
Homework	5 %	cf. section 11
Project	20 %	cf. section 11
Labs	10%	cf. section 10
Midterm	25 %	Week #7
Final Exam	35 %	As per registrar's schedule

13. Assessment Instruments:

Assessment	Course Learning Outcomes
In-class Quizzes	O1–O7
Homework and Project	O1–O7
Laboratory Assignments	O1–O7
Midterm Exam	O1, O5–O6
Final Exam	O1–O7

14. Contribution of Course to Program Outcomes:

BSCS Program Outcomes	Emphasis in this course	Course Learning Outcomes
(1) Analyze a complex computing problem and apply principles of computing and other relevant disciplines to identify solutions.	◑	O1–O7
(2) Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline.	◑	O1–O7
(3) Communicate effectively in a variety of professional contexts.		
(4) Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.		
(5) Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.		
(6) Apply computer science theory and software development fundamentals to produce computing-based solutions.	◑	O1–O7

Emphasis: ● High; ◑ Medium; ○ Low; Blank – Nothing Specific Expected

15. Letter Grade Policy:

Grade	Range
A	>=93
A-	>=90 and < 93
B+	>=85 to <90
B	>=80 to <85
B-	>=75 to <80
C+	>=70 to <75
C	>=65 to <70
C-	>=60 to <65
D	>=55 to <60
F	<55

16. Course Policies:

- During Exams, any sort of communication with another individual or using any medium of help other than the allowed material is prohibited. The answers to the questions must be your work/answers.
    - Any attempts to copy any other student's work or use unauthorized assistance are considered cheating.
- **Use of Generative AI:**
    - **During HomeWorks, Labs, Exams and Quizzes, it is considered an academic integrity violation to represent output of a generative artificial intelligence tool as your own work.**
    - **You will only be allowed to use Generative AI tools, in the project. When allowed, you should follow the project instructions and indicate how and where generative AI tools were used. Copying and pasting code from external sources and claiming it is your code is not allowed.**
- In the unlikely event of academic dishonesty in coursework (apart from written exams or quizzes), a grade of zero is given in all coursework. Additionally, the incident will be reported to the dean's office for further disciplinary action.
- Any Academic misconduct and violation of the code will be treated seriously with penalties including a failing grade of XF for the course, or suspension for the semester.
- No makeup exams or quizzes will be given. If a quiz/exam is missed **with a valid medical excuse**, its weight will be transferred to other similar assessments.
- A student who misses more than 15% of the lectures/labs can be assigned a "**W**" grade.
- Attending labs is also a must. If a student misses a lab without a valid excuse, then they will get a grade of 0 for that particular lab work.