1. **Course Number and Course Title**
   COE312 – SOFTWARE DESIGN FOR ENGINEERS

2. **Credit Hours**
   2-3-3

3. **Prerequisites and/or Co-Requisites:**
   Prerequisites: CMP220 (Programming II) and COE241 (Microcontrollers: Programming and Interfacing) or CMP240 (Introduction to Computer systems)

4. **Name and Contact Information of Instructor:**
   Dr. Imran Zualkernan
   Office: EB1-260
   Email: izualkernan@aus.edu
   Phone: (06)515-2953
   Office Hours: Posted on office door

5. **Course Description (Catalog Description):**
   Covers software design patterns. Advanced Java programming including multi-threading, collection, I/O and communication libraries. Using Java to implement wired and wireless communication interfaces including reading and writing, serial, parallel, synchronous and asynchronous streams and sockets. Message and event-based software architectures. Course project.

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

   Textbook:

   Herbert Schildt, *Java Beginner's Guide*, Oracle Press, Sixth Edition

   Other supplemental material:

   Eric Freeman, Bert Bates, Kathy Sierra, Elisabeth Robson, *Head First Design Patterns*, O'Reilly Media; 1 edition (November 4, 2004).

   Slides.

7. **Learning Outcomes:**
   Upon completion of the course, students will be able to:
   1.   Use Java to build non-trivial multi-threaded applications
   2.   Effectively utilize I/O and Collection classes in Java applications
   3.   Characterize and use design patterns in software application design
   4.   Design and build event-based software/hardware architectures
   5.   Design and build message-based software/hardware architectures
   6.   Write simple communication programs using Sockets

8. **Teaching and Learning Methodologies:**

Methods include lectures; problem and project based learning methods (homework, simulation-based projects) and class discussions.

9. Course Topics and Schedule:

Topic	Weeks
1. Introduction to Java programming	1
2. The I/O Package in Java	2
3. Collection Package in Java	2
4. Multi-threading in Java	2
5. Introduction Design Patterns	2
6 Advanced Design Patterns	1
7. Persistent storage techniques	0.5
8. Message-based Software Architectures	1.5
9. Event-based Software Architectures	1
9. Socket Programming using Java	1
Total:	**14**

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

Lab #	Topics
Lab 1	Introduction to java- Classes, Packages, Variables, Loops
Lab 2	IO Package : File IO, Serial IO, Parallel IO
Lab 3	Wireless communications, Interfacing wireless communication with Java
Lab 4	Collection Package
Lab 5	Threads and thread synchronization
Lab 6	Threads, Communication between threads, Deadlocks
Lab 7	Introduction to Design Patterns
Lab 8	Hands on experience on Arduino software and its compatible hardware. Advanced Design Patterns
Lab 9	Making pressure sensors, interfacing RFID and Servo motor, Wireless communication, Persistent Storage Technique
Lab 10	Message Based Software Architectures
Lab 11	Event Based Software Architectures
Lab 12	Socket Programming Using Java

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

HW #	Topics
HW 1	Introduction to java- Classes, Packages, Variables, Loops
HW 2	IO Package : File IO, Serial IO, Parallel IO
HW 3	Wireless communications, Interfacing wireless communication with Java
HW 4	Collection Package
HW 5	Threads and thread synchronization
HW 6	Threads, Communication between threads, Deadlocks
HW 7	Introduction to Design Patterns

HW 8	Hands on experience on Arduino software and its compatible hardware. Advanced Design Patterns
HW 9	Making pressure sensors, interfacing RFID and Servo motor, Wireless communication, Persistent Storage Technique
HW 10	Message Based Software Architectures
HW 11	Event Based Software Architectures
HW 12	Socket Programming Using Java

12. Student Evaluation:

Assessment	Weight	Due Date
Homework	5%	
Labs	10%	
Programming Quiz1	1.25%	
Programming Quiz2	1.25%	
Programming Quiz3	1.25%	
Programming Quiz4	1.25%	
Midterm Exam 1	10%	
Midterm Exam 2	**20%**	
Final Exam	30 %	
Class Project	20%	

Grading Scheme

Grade	Range
A	93 and above
A-	89 to 92
B+	84 to 88
B	80 to 83
B-	75 to 79
C+	70 to 74
C	66 to 69
C-	60 to 65
D	50 to 59
F	<50

1. **Course rules:**
- Attendance is mandatory according to AUS rules. Missing 15% of classes implies dismissal from the course (regardless of whether or not the absence is justified).
- Students are asked to attend classes on time. Three occurrences of being late will be counted as one absence. Students might not be allowed into the class once the professor starts lecturing
- Attending labs is also a must. If a student misses a lab then s/he will get a grade of zero for that particular lab work.
- There are no make-up exams. If a student misses an exam without a valid reason then s/he will get a grade of 0 for that particular exam. If you have a valid reason as per AUS rules, then your

average grade will be substituted for the missed exam. The only exception is the final examination which must be attempted.

- 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 actions.
- In the unlikely event of academic dishonesty in written exams, the incident will be reported to the dean's office for a severe disciplinary action.
- Students shall not collaborate in any form in delivering coursework. Rather, students are encouraged to collaborate and interact with the course professor and lab instructor.
- Office hours are your right not your privilege, please make use of them. If there is a need to meet with the instructor outside the published office hours then please make an appointment.
- Feedback from students during the semester regarding the course or the professor is most welcomed.
- Coursework must be submitted on time. 33% will be deducted per late day.
- Final exam is comprehensive.
- Switch off your mobile phone during classes and lab sessions.

2. Lab rules:
1. Once in the lab, the students shall download the lab assignment form ilearn.
2. Students are encouraged to bring in their books and notes to make use of them during the lab session.
3. Once the students finish, they are required to store their solutions and snapshots of the results in a word document report. The report is uploaded on ilearn.
4. Students should not communicate during the labs session, the only help they can get is from the lab instructor, lab helper and professor.
5. Grading will take into account the readability of the code, this includes indentation, inserting comments if needed and using meaningful names for the variables.
6. If a student submits faked snapshots of the results of any lab question then he/she will get a zero for the whole lab session and this will be treated as an incident of cheating.
7. The lab instructor will then post the solution of the lab on ilearn.
8. The quizzes will be held in the lab, the students will be allowed to use the complier.