Course Specifications

Course Title:	Recommender System
Course Code:	AI 426
Program:	Information and Computer Sciences
Department:	Information and Computer Sciences
College:	College of Science
Institution:	Majmaah University

Table of Contents

A. Course Identification

1. Credit hours:	
2. Course type	
a. University ☐ College ☐ Department ☐ Others ☐	
b. Required ☐ Elective ■	
3. Level/year at which this course is offered:	
4. Pre-requisites for this course (if any)**:** Machine Learning – AI 411	
5. Co-requisites for this course (if any)**:**	

6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	48	80 %
2	Blended	6	10 %
3	E-learning	6	10 %
4	Correspondence		
5	Other		

7. Actual Learning Hours (based on academic semester)

No	Activity	Learning Hours
Contact Hours		
1	Lecture	30
2	Laboratory/Studio	20
3	Tutorial	10
4	Others (specify)	
	Total	60
Other Learning Hours*		
1	Study	30
2	Assignments	30
3	Library	10
4	Projects/Research Essays/Theses	30
5	Others (specify)	
	Total	100

* The length of time that a learner takes to complete learning activities that lead to achievement of course learning outcomes, such as study time, homework assignments, projects, preparing presentations, library times

B. Course Objectives and Learning Outcomes

1. Course Description

The course provides participants to learn the essentials of recommender systems and its applications. The course introduces various ways and attention points of building a recommendation system. This is followed by an-depth discussion on collaborative filtering, one of the most popular ways of building recommender systems nowadays. The course further, discuss model based collaborative filtering, which relies on machine learning techniques to build recommendation systems. The course elaborates on content filtering and knowledge-based filtering. The course concludes by reviewing recommendation system attacks, software and challenges.

2. Course Main Objective

- To develop state-of-the-art recommender systems that automate a variety of choice-making strategies with the goal of providing affordable, personal, and high quality recommendations.
- In the current age of information overload, recommender systems offer personalized access for users to efficiently search information and make choices online.
- This course introduces recommender systems' major concepts, methodologies, evaluation design, and user experiences.

3. Course Learning Outcomes

	CLOs	Aligned PLOs
1	**Knowledge:**	
1.1	Recognize current technologies skills and tools necessary for the practices discipline.	**K1**
1.2	Understand current of advanced AI technologies that enable machines to sense, comprehend, act and learn on their own	**K3-AI**
1.3		
1...		
2	**Skills :**	
2.1	Design, implement and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline	**S1**
2.2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.	**S3- AI**
2.3		
2...		
3	**Competence:**	
3.1	Show the ability to discuss AI techniques with stakeholders to define their scopes, limitations, and social impacts.	**C3-A**
3.2		
3.3		
3...		

C. Course Content

No	List of Topics	Contact Hours
1	Introduction to Recommender Systems: Definition, Business Value, Impact, Items and users, Personalized versus un-personalized recommendation, and Recommendation System Challenges.	10
2	Building a Recommender System: User Interest, Scalability problem, Sparsity problem Rating bias problem, Recommender system workings, Collaborative	15

	filtering, Content filtering, Knowledge based filtering, Goal of Recommender System, Evaluating recommender systems.	
3	Collaborative Filtering: Definition, User-User Collaborative Filtering, Item-Item Collaborative Filtering, Recursive Collaborative Filtering, Advantages, Disadvantages.	10
4	Content Filtering: Basic Idea, Item and User profiles, Advantages, Disadvantages. Knowledge Based Filtering. Hybrid Filtering.	10
5	Deep Learning neural networks for recommendation: Neural networks, Deep learning neural networks, Deep neural networks for recommendation.	15
Total		60

D. Teaching and Assessment

1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
1.0	**Knowledge**		
1.1	Recognize current technologies skills and tools necessary for the practices discipline.	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
1.2	Understand current of advanced AI technologies that enable machines to sense, comprehend, act and learn on their own	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
…			
2.0	**Skills**		
2.1	Design, implement and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
2.2	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
…			
3.0	**Competence**		
3.1	Show the ability to discuss AI techniques with stakeholders to define their scopes, limitations, and social impacts.	Lectures, Individual presentations & Brainstorming exercises	Quiz , Mid Exam , Assignment, Final Exam, Individual demonstrations.
..			

2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Quizzes		10 %
2	Mid Exams		30 %
3	Assignments		10 %
4	Group Discussion, Presentation		10 %
5	Final Exam		40 %

*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

E. Student Academic Counseling and Support

Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

F. Learning Resources and Facilities

1.Learning Resources

Required Textbooks	Recommender Systems: Advanced Developments (Intelligent Information Systems), Jie Lu , Qian Zhang , Guangquan Zhang, (WSPC 2020) by Francesco Ricci, Lior Rokach, Bracha Shapira, Paul B. Kantor.
Essential References Materials	Practical Recommender Systems (Manning Publications 2019) By Kim Falk
Electronic Materials	Determines as the course is going on.
Other Learning Materials	Videos and presentations are available with instructor

2. Facilities Required

Item	Resources
Accommodation (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classrooms and Labs as those that are available at college of science, Az Zulfi
Technology Resources (AV, data show, Smart Board, software, etc.)	Smart Board and required software
Other Resources (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
course evaluation	Student-faculty management meeting	Questionnaires
Evaluation of Teaching	Program/Department Instructor	Discussion within the staff members teaching the course Departmental internal review of the course.

Evaluation Areas/Issues	Evaluators	Evaluation Methods

Evaluation areas (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)
Evaluators (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)
Assessment Methods (Direct, Indirect)

H. Specification Approval Data

Council / Committee	
Reference No.	
Date	