



National Computing Education Accreditation Council NCEAC

COURSE DESCRIPTION FORM

INSTITUTION National University of Computer and Emerging Sciences (NUCES-FAST)

PROGRAM (S) TO BE EVALUATED BS (CS)

A. Course Description

Course Code	CS4053
Course Title	Recommender System
Credit Hours	3+0
Prerequisites by Course(s) and Topics	-
Assessment Instruments with Weights (homework, quizzes, midterms, final, programming assignments, lab work, etc.)	Midterm I: 15 marks Midterm II: 15 marks Course Project: 10 marks Assignments: 10 marks Finals: 50 marks
Course Coordinator	Syed Zain Ul Hassan
URL (if any)	-
Current Catalog Description	-
Textbook (or Laboratory Manual for Laboratory Courses)	<i>Recommender systems handbook</i> , by F. Ricci, L. Rokach, B. Shapira and P.B. Kantor, (Springer)



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Reference Material	To be provided in the form of slides and tutorials.																		
	Resources link: TBA																		
Course Goals	<table><tr><th colspan="3">A. Course Learning Outcomes (CLOs)</th></tr><tr><td colspan="3"><div>1. <i>Describe different techniques in making automatic personalized recommendations in various scenarios</i> [Bloom's Taxonomy Level: 3, Learning Domain: Cognitive]</div><div>2. <i>Solve mathematical optimization problems pertaining to recommender systems</i> [Bloom's Taxonomy Level: 3, Learning Domain: Cognitive]</div><div>3. <i>Discuss how a recommender system should be evaluated in terms of the system's performance and the user's satisfaction with the system</i> [Bloom's Taxonomy Level: 6, Learning Domain: Cognitive & Psychomotor]</div><div>4. <i>Learn about advanced topics and current applications of recommender systems in realms like social networks and communities</i> [Bloom's Taxonomy Level: 6, Learning Domain: Cognitive & Psychomotor]</div></td></tr><tr><th colspan="3">B. Program Learning Outcomes</th></tr><tr><td>1. Computing Knowledge</td><td>Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.</td><td>CLO-1</td></tr><tr><td>2. Problem Analysis</td><td>Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences.</td><td>CLO-2</td></tr><tr><td>3.Design/Develop Solutions</td><td>Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate</td><td>CLO-3</td></tr></table>	A. Course Learning Outcomes (CLOs)			<div>1. <i>Describe different techniques in making automatic personalized recommendations in various scenarios</i> [Bloom's Taxonomy Level: 3, Learning Domain: Cognitive]</div> <div>2. <i>Solve mathematical optimization problems pertaining to recommender systems</i> [Bloom's Taxonomy Level: 3, Learning Domain: Cognitive]</div> <div>3. <i>Discuss how a recommender system should be evaluated in terms of the system's performance and the user's satisfaction with the system</i> [Bloom's Taxonomy Level: 6, Learning Domain: Cognitive & Psychomotor]</div> <div>4. <i>Learn about advanced topics and current applications of recommender systems in realms like social networks and communities</i> [Bloom's Taxonomy Level: 6, Learning Domain: Cognitive & Psychomotor]</div>			B. Program Learning Outcomes			1. Computing Knowledge	Apply knowledge of mathematics, natural sciences, computing fundamentals, and a computing specialization to the solution of complex computing problems.	CLO-1	2. Problem Analysis	Identify, formulate, research literature, and analyze complex computing problems, reaching substantiated conclusions using first principles of mathematics, natural sciences, and computing sciences.	CLO-2	3.Design/Develop Solutions	Design solutions for complex computing problems and design systems, components, and processes that meet specified needs with appropriate	CLO-3
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	Long-tail principle and curse of dimensionality	1	3	2
	Rule-based and Naïve Bayes CF	1	3	1
	Mid-term I			
	Introduction and basic components of Content-based recommendation system	1	4	1
	Feature selection and refinement, revisiting curse of dimensionality	2	6	2
	Content-based vs CF recommendations	1	3	1
	Mid-term II			
	Knowledge-based recommendations, Constraint-based and case-based recommendation system	1	3	1
	Evaluation measures for recommendation systems and performance issues	1	3	3
	Recommender system application in social media and communities	1	3	4
	Context-aware RS, introduction to factorization, Neural Networks and reinforcement learning	1	3	4
	Final Exam			
	Total	14	43	
Laboratory Projects/Experiments Done in the Course	<p>The lab work to be done in the course include hands-on exercises for the following topics:</p> <ul style="list-style-type: none"> ▪ Simple CF Recommender System for products recommendation ▪ Feature selection ▪ Social media recommendation <p>One group project will be submitted by the students in the penultimate week of the semester.</p>			
Programming Assignments Done in the Course	Assignments related to collaborative filtering, similarity measures, knowledge-based recommendations and evaluation techniques			
Class Time Spent on (in credit hours)	Theory	Problem Analysis	Solution Design	Social and Ethical Issues
	15	15	13	0



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Oral and Written Communications	A project report detailing the problem, tools, methods used in the course project to be submitted by every student.
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Instructor Name: Syed Zain Ul Hassan

Instructor Signature: _____

Dated: 24th January 2023