College of Computer and Information Sciences

Computer Science Department

B.Sc. in Computer Science

Information Technology Department

B.Sc. in Information Technology

Program Learning Outcomes Courses Matrix

2022-2023

NCAAA Code	ABET Code	Description
S1	SO (1)	Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
S2	SO (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.
S3	SO (3)	Communicate effectively in a variety of professional contexts.
V2	SO (4)	Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
V1	SO (5)	Function effectively as a member or leader of a team engaged in activities appropriate to the program's discipline.
S4 [CS]	SO (6) [CS]	Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]
S4 [IT]	SO (6) [IT]	Use systemic approaches to select, develop, apply, integrate, and administer secure computing technologies to accomplish user goals. [IT]
S5	SO(7)	An ability to apply knowledge of computing and mathematics appropriate to the discipline.
K1	SO(8)	An ability to understand a problem and identify the computing requirements appropriate to its solution.

Students Outcomes (Program Learning Outcomes) Mapping to courses

1. Common Courses between CS & IT Programs

Old Code	New Code	Course Name	Level	Requirement Type	K1 SO(8)	S1 SO(1)	S2 SO(2)	S3 SO(3)	S4 SO(6)	S5 SO(7)	V1 SO(5)	V2 SO(4)
-	IT112	Computer Fundamentals	1	College	√	√						
-	EN111	ENGLISH 1	1	College				√				
-	EN122	ENGLISH2	2	College				√				
-	IT232	Selected topics in emerging technologies	6	College	√	√						
CS 110	CS131	Programming 1	3	College	√	√						
CS 120	CS211	Programming 2	4	College		√	√				√	
CS 210	CS231	Data Structures	5	College		√	√				√	
CS 240	CS311	Operating Systems	6	College		√	√					
ENG 114	EN212	Technical English 1	3	College				√				
ENG 127	EN221	Technical English 2	4	College				√				
IS 231	IS213	Fundamental of Database	5	College	√		√					
IS 334	IS333	Project Management	8	College				√			√	√
IT 481	IT335	Ethics & Professional Practice	8	College	√			√				√
MATH 111	MH121	Discrete Mathematics	3	College	√	√				√		
MATH 112	MH113	Calculus1	3	College	√	√				√		
MATH 126	MH132	Calculus 2	4	College	√	√				√		
PHY 104	PHY123	Physics 1	3	College	√	√				√		
STAT 102	STAT133	Probability and Statistics	4	College	√	√				√		
CS 312	CS322	Computer Organization	6	CS & IT Programs		√	√					

Old Code	New Code	Course Name	Level	Requirement Type	K1 SO(8)	S1 SO(1)	S2 SO(2)	S3 SO(3)	S4 SO(6)	S5 SO(7)	V1 SO(5)	V2 SO(4)
CS 360	CS314	Software Engineering	6, 8	CS & IT Programs		√	√	√			√	
IT 250		Elective Professional (1)	5	CS & IT Programs		√	√					√
IT 341	IT324	Data Transmission & Computer Networks	7	CS & IT Programs		√	√	√			√	
IT 470		Elective Professional (2)	9	CS & IT Programs			√					√
IT 471		Elective Professional (3)	10	CS & IT Programs			√	√			√	
MATH 107	MH222	Linear Algebra	5	CS & IT Programs	√	√				√		

2. Computer Science Program Courses

Old Code	New Code	Course Name	Level	Requirement Type	S1 SO(1)	S2 SO(2)	S3 SO(3)	V2 SO(4)	V1 SO(5)	S4 SO(6)	S5 SO(7)	K1 SO(8)
CS 270	CS323	Programming Languages	6	CS Program	√		√					√
CS 305	CS334	Algorithm Design and Analysis	7	CS Program	√	√				√		
CS 310	CS233	Computer Graphics	7	CS Program	√	√				√		
CS 320	CS424	Artificial Intelligence	7	CS Program		√			√	√	√	
CS 330	CS412	Compilers	7	CS Program	√	√				√		
CS 350	CS439	Parallel and Distributed Computing	8	CS Program	√	√				√		
CS 399	CS331	Seminar	8	College			√	√	√			
CS 432	CS413	Software Modeling and Analysis	10	CS Program		√	√		√			
CS 450	IT420	Information Security	9	CS Program	√	√		√	√			
GE 107	GE313	Science Elective	6	CS Program	√						√	√
MATH 205	MH223	Differential Equations	5	CS Program	√						√	√
MATH 254	MH423	Numerical Methods	8	CS Program	√						√	√
PHY 125	PHY214	Physics 2	4	CS Program	√						√	√
CS 430	CS430	Design and Architecture of Large Software Systems	9 or 10	CS Track (1)		√			√	√		
CS 431	CS 431	Low-Level Design of Software	9 or 10	CS Track (1)		√		√	√	√		
CS 434	CS 434	Software Evolution (Maintenance)	9 or 10	CS Track (1)		√			√	√		
CS 435	CS 435	Software Architectures	9 or 10	CS Track (1)		√		√	√	√		
	CS436	Selected Topics in Software Engineering	9 or 10	CS Track (1)		√		√	√	√		
	CS446	Software Requirements Analysis	9 or 10	CS Track (1)		√		√	√	√		

Old Code	New Code	Course Name	Level	Requirement Type	S1 SO(1)	S2 SO(2)	S3 SO(3)	V2 SO(4)	V1 SO(5)	S4 SO(6)	S5 SO(7)	K1 SO(8)
	CS447	User Interface and User Experience Design	9 or 10	CS Track (1)		√		√	√	√		
	CS452	Security Management	9 or 10	CS Track (1)		√		√	√	√		
CS 440	CS451	Coding and Information Theory	9 or 10	CS Track (2)		√			√	√		
CS 442	CS453	Computer Security	9 or 10	CS Track (2)		√			√	√		
-	CS454	Formal Methods of Cryptography	9 or 10	CS Track (2)		√			√	√		
CS 444	CS455	Internet Security, tools & techniques	9 or 10	CS Track (2)		√			√	√		
CS 445	CS456	Network Management and Security	9 or 10	CS Track (2)		√		√	√	√		
CS 470	CS470	Introduction to Data Science	9 or 10	CS Track(3)		√			√	√		
CS 471	CS 471	Big Data Analytics	9 or 10	CS Track(3)		√			√	√		
CS 472	CS 472	Probability & Statistics for Data Science	9 or 10	CS Track(3)		√			√	√		
CS 473	CS 473	Data Visualization	9 or 10	CS Track(3)		√			√	√		
CS 474	CS 474	Selected Topics in Data Science	9 or 10	CS Track(3)		√			√	√		
-	CS 475	Data Mining	9 or 10	CS Track(3)		√			√	√		
CS 460	CS 460	Computer Vision	9 or 10	CS Track(3)		√			√	√		
CS 462	CS 462	Machine Learning	9 or 10	CS Track(3)		√			√	√		
CS 461	CS 461	Intelligent Agents	9 or 10	CS Track(3)		√			√	√		
CS 463	CS 463	Natural Langugae Processing	9 or 10	CS Track(3)		√			√	√		
CS 464	CS 464	Robotics	9 or 10	CS Track(3)		√			√	√		
-	CS465	Selected Topics in AI	9 or 10	CS Track(3)		√			√	√		

3. Information Technology Program Courses

Old Code	New Code	Course Name	Level	Requirement Type	S1 SO(1)	S2 SO(2)	S3 SO(3)	V2 SO(4)	V1 SO(5)	S4 SO(6)	S5 SO(7)	K1 SO(8)
IS 232	IS233	Database Management Systems	6	IT Program	√	√				√		√
IS 241	IS413	System Analysis & Design	8	IT Program	√	√				√		
IT 200	-	IT Fundamentals	4	IT Program	√							√
IT 210	IT223	Visual Programming	5	IT Program	√	√	√					√
IT 311	IT323	Database Lab	6	IT Program	√	√						√
IT 321	IT313	Multimedia & Web Design	7	IT Program	√	√						√
IT 331	IT334	Human Computer Interactions	7	IT Program	√	√	√					√
IT 332	IT412	System Integration	7	IT Program	√	√				√		
IT 342	IT416	Computer Networks Lab	8	IT Program		√	√			√		
IT 343	IT420	Information Security	8	IT Program	√			√		√		√
IT399	CS331	Seminar	8	IT Program			√	√	√			
IT 411	IT495	Cloud Computing	9	IT Program	√	√		√				
IT 432	IT 432	Systems Administration and Maintenance	8	IT Program	√	√				√		
IT 422	-	Infrastructure Environment and Network Servers	9 or 10	IT Track (1)		√			√	√		
IT 426	-	Mobile & Wireless Networks	9 or 10	IT Track (1)		√			√	√		
IT 452	-	Web Development Using Content Management Systems	9 or 10	IT Track (2)		√			√	√		
IT 455	-	Advanced Web Applications Development	9 or 10	IT Track (2)		√				√		
IT 457	-	Selected Topics in Web Technologies	9 or 10	IT Track (2)		√			√	√		
IT 458	-	Selected Topics in Multimedia	9 or 10	IT Track (2)		√				√		

Old Code	New Code	Course Name	Level	Requirement Type	S1 SO(1)	S2 SO(2)	S3 SO(3)	V2 SO(4)	V1 SO(5)	S4 SO(6)	S5 SO(7)	K1 SO(8)
IT 491	-	Digital Forensics Foundations	9	IT Track (3)				√		√		
IT 492	-	Operating Systems Forensics	9	IT Track (3)				√	√	√		
IT 493	-	Mobile and Network Forensics	10	IT Track (3)				√	√	√		
IT 494	-	Malware and Software Vulenrability Analysis	10	IT Track (3)				√	√	√		
IT460	IT460	Applied Cryptography	10	IT Track (4)								
IT 461	IT 461	Network Security	9	IT Track (4)				√	√	√		
IT465	IT465	Penetration testing and Vulnerability Analysis	10	IT Track (4)			√	√				√
IT 462	IT 462	Enterprise Cyber Security	10	IT Track (4)				√	√	√		
-	IT464	Security Governance	10	IT Track (4)		√	√			√		
-	IT463	Software Security Design	10	IT Track (4)		√	√			√		
-	IT472	Cloud services management	10	IT Track (4)		√	√			√		
-	IT473	Cloud Computing Security	10	IT Track (4)		√	√			√		
-	IT474	Application development in cloud	10	IT Track (4)		√	√			√		
-	IT475	Intelligent Cloud computing	10	IT Track (4)		√	√			√		
-	IT476	Cloud Architecture	10	IT Track (4)		√	√			√		
-	IT477	Cloud Operations	10	IT Track (4)		√	√			√		
-	IT478	Advanced Topics in Cloud Computing	10	IT Track (4)		√	√			√		