



ABDULLAH AL SALEM UNIVERSITY (AASU)

College of Computing & Systems

Undergraduate Academic Programs

2023/2024

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1. General Introduction

The College of Computing and Systems at AASU is dedicated to the advancement of knowledge and practical application of cutting-edge technology. We are determined to prepare students for successful careers in the dynamic fields of computing and systems engineering. We offer a range of undergraduate programs designed to equip students with the skills and expertise needed to excel in the ever-evolving world of technology. Our undergraduate programs include:

- 1) Computer Systems Engineering
- 2) Cyber Security Engineering
- 3) BSc. Data Science and Artificial Intelligence
- 4) BSc. Software Engineering

At the College of Computing and Systems, we pride ourselves on our commitment to academic excellence and experiential learning. We offer Capstone Projects that seamlessly integrates classroom learning with hands-on experience, allowing our students to bridge the gap between theory and practice. Furthermore, our educational approach emphasizes practical learning tools, mentorship, and state-of-the-art equipment. We are dedicated to providing our students with the resources they need to succeed in their academic journey and beyond. As technology continues to shape the world, the College of Computing and Systems at AASU stands at the forefront of preparing the next generation of innovators and problem solvers.

2. The Vision

The AASU shall be an institution of choice that will contribute to socio-economic development of Kuwait by promoting innovation in education, world-class research, creativity, and entrepreneurship.

3. The Mission

To establish a strong and balanced academic programs, research, and outreach programs, that contribute to the development and advancement of Kuwait and the region.

4. Program Development

The University of Abdullah Al Salem has meticulously designed all its academic programs in alignment with the comprehensive framework outlined by the Kuwait Vision 2035. These programs have been developed with a keen focus on addressing the evolving needs of the job market, as highlighted in studies conducted by esteemed institutions such as the Supreme Council for Planning and Development, the Kuwait Foundation for the Advancement of Sciences, and the World Bank. Furthermore, the university has closely examined the required skill sets for the workforce through research conducted by the Kuwait Institute for Scientific Research. The curriculum also draws inspiration from insights gathered during interviews with both public and private sector entities. This integration extends to the diverse specializations offered at Kuwait University, facilitating a multidisciplinary approach. Additionally, the University of Abdullah Al Salem aims to enhance its regional and global presence in academic fields. Through the above mentioned points, the university ensures its programs are not only forward-thinking but also responsive to the demands of the modern world.

5. Graduate Attributes:

- Highly employable individuals able to immediately contribute to their respective workforce and link the core concepts and applications of the discipline to intended fields of occupation.
- Creative thinkers and problem solvers able to use their intellectual curiosity and critical thinking to find sustainable solutions to complex, real-life problems.
- Effective collaborators able to communicate professionally, adapt, debate and act as team players.
- Entrepreneurial individuals able to identify an opportunity and transform a concept into reality.
- Responsible global citizens and lifelong learner able to act in a manner that promotes professionalism, ethical behavior, accountability, social responsibility, and engage in a self-motivated pursuit of knowledge for either personal fulfillment or professional growth.

6. College of Computing & Systems

a. Computer System Engineering

Graduating with a Bachelor of Science in Computer Systems Engineering necessitates the successful completion of a total of 132 credit hours (CH). These credit hours are distributed across different university (36 CH), college (55 CH), and program requirements (41 CH), encompassing courses that are essential as well as elective courses chosen by the students. The following table 1 shows the recommended study plan distributed over eight semesters.

Table 1. Recommended Study Plan.

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 1	XXX000	Arts and Humanities (I)	UM			3	3
	ENL101	English for Academic Studies	UM			3	3
	MAT101	Calculus I	UM			3	3
	PHY101	Physics I	UM			3	3
	PHY105	Physics I Lab	CM		PHY101	1	3
	MAT120	Discrete Mathematics	CM			3	3
	INF 120	Computers and Information Systems	UM			3	3
Total						19	21
Semester 2	CHM101	Chemistry I	CM			3	3
	CHM105	Chemistry I Lab	CM		CHM101	1	3
	MAT102	Calculus II	CM	MAT101		3	3
	ENL102	English Composition	UM			3	3
	CCS120	Computational Thinking & Programming	CM			3	3
	CCS121	Computational Thinking & Programming Lab	CM		CCS120	1	3
	ENI150	Professionalism and Ethics	UM			3	3
Total						17	21
Semester 3	CCS100	Digital Logic and Design	CM			3	3
	MAT121	Abstract Algebra	CM	MAT102		3	3
	MAT221	Number Theory	CM	MAT102		3	3
	ENL201	Writing and Research	UM			3	3
	CCS220	Object-Oriented Design & programming	CM	CCS120		3	3
	CCS221	Object-Oriented Design & programming Lab	CM		CCS220	1	3
	MAT240	Ordinary Differential Equations	CM	MAT102		3	3
Total						19	21
Semester 4	COM131	Creativity and Problem Solving	UM			3	3
	MAT130	Probability and Statistics	CM			3	3
	MAT260	Numerical Methods	CM	MAT121		3	3
	CCS230	Fundamentals of Database Systems	CM	CCS220		3	3
	CCS231	Fundamental of Database Systems Lab	CM		CCS230	1	3
	CCS240	Fundamentals of Operating Systems	CM			3	3
	CCS241	Fundamentals of Computer Networks	CM			3	3
Total						19	21

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 5	CME210	Circuits and Electronics	PM			3	3
	CME211	Circuits and Electronics Lab	PM		CME210	1	3
	CME220	Introduction to Computer Systems Engineering	PM			3	3
	CCS320	Data Structures and Algorithms	CM	CCS220		3	3
	CCS321	Data Structures and Algorithms Lab	CM		CCS320	1	3
	CCS330	Web Engineering	CM	CCS230		3	3
	CCS331	Web Engineering Lab	CM		CCS330	1	3
Total						15	21

Semester 6	CME 310	Computer Architecture and Organization	PM	CCS100		3	3
	CME 311	Computer Architecture and Organization Lab	PM		CME 310	1	3
	CME341	Systems and Signal Processing	PM	CME210		3	3
	CME360	Network and System Security	PM			3	3
	XXX000	Arts and Humanities (II)	UM			3	3
	ENI201	Globalization and Sustainability	UM			3	3
Total						16	18

Semester 7	CME410	Programming for Computer Engineering	PM	CCS220		3	3
	CME411	Programming for Computer Engineering Lab	PM		CME 410	1	3
	CME420	Embedded and Microprocessor Systems	PM	CME 310		3	3
	CME421	Embedded and Microprocessor Systems Lab	PM		CME420	1	3
	CMExxx	Elective I	PE			3	3
	CME490	Capstone Project I	PM			3	3
Total						14	18

Semester 8	XXX000	Arts and Humanities (III)	UM			3	3
	CME430	Digital Systems Design	PM	CME 310		3	3
	CME431	Digital Systems Design Lab	PM		CME430	1	3
	CMExxx	Elective II	PE			3	3
	CME491	Capstone Project II	PM			3	3
Total						13	15

Table 2. Program Elective Courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
CME 350	Industrial Training	(3 credits)	3		
CME 435	Formal Language and Automata	(3 credits)	3	CCS220	
CME 440	Real time systems	(3 credits)	3	CME 310	
CME 441	VHDL Programming	(3 credits)	3	CME 410	
CME 442	Parallel and Distributed Computing	(3 credits)	3	CME 341	
CME 443	Simulation Modeling and Analysis	(3 credits)	3	CME 310	

b. Cybersecurity Engineering

Graduating with a Bachelor of Science in Cybersecurity Engineering necessitates the successful completion of a total of 132 credit hours (CH). These credit hours are distributed across different university (36 CH), college (55 CH), and program requirements (41 CH), encompassing courses that are essential as well as elective courses chosen by the students. The following table 3 shows the recommended study plan distributed over eight semesters.

Table 3. Recommended Study Plan.

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 1	XXX000	Arts and Humanities (I)	UM			3	3
	ENL101	English for Academic Studies	UM			3	3
	MAT101	Calculus I	UM			3	3
	PHY101	Physics I	UM			3	3
	PHY105	Physics I Lab	CM		PHY101	1	3
	MAT120	Discrete Mathematics	CM			3	3
	INF 120	Computers and Information Systems	UM			3	3
Total						19	21
Semester 2	CHM101	Chemistry I	CM			3	3
	CHM105	Chemistry I Lab	CM		CHM101	1	3
	MAT102	Calculus II	CM	MAT101		3	3
	ENL102	English Composition	UM			3	3
	CCS120	Computational Thinking & Programming	CM			3	3
	CCS121	Computational Thinking & Programming Lab	CM		CCS120	1	3
	ENI150	Professionalism and Ethics	UM			3	3
Total						17	21
Semester 3	CCS100	Digital Logic and Design	CM			3	3
	MAT121	Abstract Algebra	CM	MAT102		3	3
	MAT221	Number Theory	CM	MAT102		3	3
	ENL201	Writing and Research	UM			3	3
	CCS220	Object-Oriented Design & programming	CM	CCS120		3	3
	CCS221	Object-Oriented Design & programming Lab	CM		CCS220	1	3
	MAT240	Ordinary Differential Equations	CM	MAT102		3	3
Total						19	21
Semester 4	COM131	Creativity and Problem Solving	UM			3	3
	MAT130	Probability and Statistics	CM			3	3
	MAT260	Numerical Methods	CM	MAT121		3	3
	CCS230	Fundamentals of Database Systems	CM	CCS220		3	3
	CCS231	Fundamental of Database Systems Lab	CM		CCS230	1	3
	CCS240	Fundamentals of Operating Systems	CM			3	3
	CCS241	Fundamentals of Computer Networks	CM			3	3
Total						19	21

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 5	XXX000	Arts and Humanities (II)	UM			3	3
	ENI201	Globalization and Sustainability	UM			3	3
	CSE210	Fundamental of cyber security Engineering	PM			3	3
	CCS320	Data Structures and Algorithms	CM	CCS220		3	3
	CCS321	Data Structures and Algorithms Lab	CM		CCS320	1	3
	CCS330	Web Engineering	CM	CCS230		3	3
	CCS331	Web Engineering Lab	CM		CCS330	1	3
Total						17	21

Semester 6	CSE310	Cryptography and Data Security	PM	CSE210		3	3
	CSE311	Cryptography and Data Security Lab	PM		CSE310	1	3
	CSE325	Cybersecurity Risk Management	PM	CSE210		3	3
	CSE326	Cybersecurity Risk Management Lab	PM		CSE325	1	3
	CSE341	Network Security	PM	CCS241		3	3
	CSE360	Ethical Hacking and Cyber laws	PM			3	3
Total						14	18

Semester 7	CSE 410	Digital Forensics	PM			3	3
	CSE411	Digital Forensics Lab	PM		CSE410	1	3
	CSE420	Software Security	PM			3	3
	CSE421	Software Security Lab	PM		CSE420	1	3
	CSExxx	Elective I	PE			3	3
	CSE490	Capstone Project I	PM			3	3
Total						14	18

Semester 8	XXX000	Arts and Humanities (III)	UM			3	3
	CSE430	Web Security	PM	CCS330		3	3
	CSE431	Web Security Lab	PM		CSE430	1	3
	CSExxx	Elective II	PE			3	3
	CSE 491	Capstone Project II	PM			3	3
Total						13	15

Table 4. Program Elective Courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
CSE 350	Industrial Training	(3 credits)	3		
CSE 343	Cyber Security Governance and Compliance	(3 credits)	3	CSE360	
CSE 430	IT Infrastructure Protection	(3 credits)	3	CSE326	
CSE 475	Operating System Security	(3 credits)	3	CCS240	
CSE 390	Distributed Network Security	(3 credits)	3	CSE 341	

c. Software Engineering

Graduating with a Bachelor of Science in Software Engineering necessitates the successful completion of a total of 132 credit hours (CH). These credit hours are distributed across different university (36 CH), college (55 CH), and program requirements (41 CH), encompassing courses that are essential as well as elective courses chosen by the students. The following table 5 shows the recommended study plan distributed over eight semesters.

Table 5. Recommended Study Plan.

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 1	XXX000	Arts and Humanities (I)	UM			3	3
	ENL101	English for Academic Studies	UM			3	3
	MAT101	Calculus I	UM			3	3
	PHY101	Physics I	UM			3	3
	PHY105	Physics I Lab	CM		PHY101	1	3
	MAT120	Discrete Mathematics	CM			3	3
	INF 120	Computers and Information Systems	UM			3	3
Total						19	21
Semester 2	CHM101	Chemistry I	CM			3	3
	CHM105	Chemistry I Lab	CM		CHM101	1	3
	MAT102	Calculus II	CM	MAT101		3	3
	ENL102	English Composition	UM			3	3
	CCS120	Computational Thinking & Programming	CM			3	3
	CCS121	Computational Thinking & Programming Lab	CM		CCS120	1	3
	ENI150	Professionalism and Ethics	UM			3	3
Total						17	21
Semester 3	CCS100	Digital Logic and Design	CM			3	3
	MAT121	Abstract Algebra	CM	MAT102		3	3
	MAT221	Number Theory	CM	MAT102		3	3
	ENL201	Writing and Research	UM			3	3
	CCS220	Object-Oriented Design & programming	CM	CCS120		3	3
	CCS221	Object-Oriented Design & programming Lab	CM		CCS220	1	3
	MAT240	Ordinary Differential Equations	CM	MAT102		3	3
Total						19	21
Semester 4	COM131	Creativity and Problem Solving	UM			3	3
	MAT130	Probability and Statistics	CM			3	3
	MAT260	Numerical Methods	CM	MAT121		3	3
	CCS230	Fundamentals of Database Systems	CM	CCS220		3	3
	CCS231	Fundamental of Database Systems Lab	CM		CCS230	1	3
	CCS240	Fundamentals of Operating Systems	CM			3	3
	CCS241	Fundamentals of Computer Networks	CM			3	3
Total						19	21

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 5	SWE210	Software Process and Methodologies	PM			3	3
	SWE220	Software Requirements Engineering	PM			3	3
	SWE221	Software Requirements Engineering Lab	PM		SWE220	1	3
	CCS320	Data Structures and Algorithms	CM	CCS220		3	3
	CCS321	Data Structures and Algorithms Lab	CM		CCS320	1	3
	CCS330	Web Engineering	CM	CCS230		3	3
	CCS331	Web Engineering Lab	CM		CCS330	1	3
Total						15	21

Semester 6	SWE 310	Human Computer Interaction	PM	SWE210		3	3
	SWE311	Human Computer Interaction Lab	PM		SWE 310	1	3
	SWE345	Software Modelling and Analysis	PM	SWE210		3	3
	SWE340	Software Design and Architecture	PM	SWE220		3	3
	SWE341	Software Design and Architecture Lab	PM		SWE 340	1	3
	XXX000	Arts and Humanities (II)	UM			3	3
Total						14	18

Semester 7	ENI201	Globalization and Sustainability	UM			3	3
	SWE420	Software Construction and Evolution	PM	SWE340		3	3
	SWE421	Software Construction and Evolution Lab	PM		SWE420	1	3
	SWE430	Software Testing and Quality Assurance	PM	SWE340		3	3
	SWE431	Software Testing and Quality Assurance Lab	PM		SWE430	1	3
	SWE XXX	Elective I	PE			3	3
	SWE490	Capstone Project I	PM			3	3
Total						17	21

Semester 8	XXX000	Arts and Humanities (III)	UM			3	3
	SWE440	Software Security	PM			3	3
	SWEXXX	Elective II	PE			3	3
	SWE491	Capstone Project II	PM			3	3
Total						12	12

Table 6. Department Elective Courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
SWE 350	Industrial Training	(3 credits)	3		
SWE 441	Software Reliability and Software Quality	(3 credits)	3	SWE 340	
SWE 442	Software Engineering Ethics	(3 credits)	3	SWE 220	
SWE 443	Software Project Management	(3 credits)	3	SWE 340 & SWE 345	
SWE 444	Modern Software Methodologies	(3 credits)	3	SWE 345	
SWE 445	Software Development and Maintenance	(3 credits)	3	SWE 340	

d. Data Science and Artificial Intelligence

Graduating with a Bachelor of Science in Data Science and Artificial Intelligence necessitates the successful completion of a total of 120 credit hours (CH). These credit hours are distributed across different university (36 CH), college (40 CH), and program requirements (44 CH), encompassing courses that are essential as well as elective courses chosen by the students. The following table 7 shows the recommended study plan distributed over eight semesters.

Table 7. Recommended Study Plan.

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 1	ENL101	English for Academic Studies	UM			3	3
	MAT101	Calculus I	UM			3	3
	PHY101	Physics I	UM			3	3
	PHY105	Physics I Lab	CM		PHY101	1	3
	MAT120	Discrete Mathematics	CM			3	3
	INF 120	Computers and Information Systems	UM			3	3
Total						16	18
Semester 2	BIO 101	Biology I	CM			3	3
	BIO105	Biology I Lab	CM		BIO 101	1	3
	XXX000	Arts and Humanities (I)	UM			3	3
	ENL102	English Composition	UM			3	3
	CCS120	Computational Thinking & Programming	CM			3	3
	CCS121	Computational Thinking & Programming Lab	CM		CCS120	1	3
Total						14	18
Semester 3	MAT121	Abstract Algebra	CM	MAT102		3	3
	ENL201	Writing and Research	UM			3	3
	CCS220	Object-Oriented Design & programming	CM	CCS120		3	3
	CCS221	Object-Oriented Design & programming Lab	CM		CCS220	1	3
	DAI250	Fundamentals of Data Science & AI	PM			3	3
	DAI251	Fundamentals of Data Science & AI Lab	PM		DAI250	1	3
Total						14	18
Semester 4	COM131	Creativity and Problem Solving	UM			3	3
	MAT130	Probability and Statistics	CM			3	3
	MAT260	Numerical Methods	CM	MAT121		3	3
	CCS230	Fundamentals of Database Systems	CM	CCS220		3	3
	CCS231	Fundamental of Database Systems Lab	CM		CCS230	1	3
	CCS240	IT Infrastructure	CM			3	3
	Total						16

	Course Code	Course Name	Course Type	Pre-R	Co-R	Credit Hours	Contact Hours
Semester 5	DAI230	Probability & Statistics for Data Science & AI	PM	MAT130		3	3
	DAI310	Machine Learning	PM	DAI250		3	3
	DAI311	Machine Learning Lab	PM		DAI310	1	3
	CCS320	Data Structures and Algorithms	CM	CCS220		3	3
	CCS321	Data Structures and Algorithms Lab	CM		CCS320	1	3
	CCS330	Web Engineering	CM	CCS230		3	3
	CCS331	Web Engineering Lab	CM		CCS330	1	3
Total						15	21

Semester 6	DAI330	Data Warehousing and Data Mining	PM	CCS230		3	3
	DAI331	Data Warehousing and Data Mining Lab	PM		DAI330	1	3
	DAI351	Neural Networks and Deep Learning	PM	DAI230, DAI310		3	3
	DAI352	Neural Networks and Deep Learning Lab	PM		DAI351	1	3
	XXX000	Arts and Humanities (II)	UM			3	3
	ENI150	Professionalism and Ethics	UM			3	3
Total						14	18

Semester 7	ENI201	Globalization and Sustainability	UM			3	3
	DAI421	Data Analytics and Visualization	PM	DAI330		3	3
	DAI430	Big Data Systems	PM	DAI330		3	3
	DAI431	Big Data Systems Lab	PM		DAI430	1	3
	DAIxxx	Program Electives I	PE			3	3
	DAI490	Capstone Project I	PM			3	3
Total						16	18

Semester 8	XXX000	Arts and Humanities (III)	UM			3	3
	DAI440	Distributed Computing	PM			3	3
	DAIxxx	Program Electives II	PE			3	3
	DAI491	Capstone Project II	PM			3	3
	DAI374	Data Ethics, Governance and Laws	PM			3	3
Total						15	15

Table 8. Department Elective Courses.

Course Code	Course Title	Credit hours	Contact hours	Pre-requisite	Co-requisite
DAI 350	Industrial Training	(3 credits)	3		
DAI432	Security Aspects of Data Science & AI	(3 credits)	3	DAI250	
DAI462	Computer Vision and Pattern Recognition	(3 credits)	3	DAI351	
DAI463	Natural Language Processing	(3 credits)	3	DAI351	
DAI477	Special topics in Data Science and AI	(3 credits)	3	DAI250	
DAI475	Business Intelligence and Decision Support Systems	(3 credits)	3	DAI351	
DAI476	Data Analytics for Risk Management & Strategic Planning	(3 credits)	3	DAI330	