Republic of Yemen

Ministry of Higher Education & Scientific Research

Council of Academic Accreditation & Quality Assurance of Higher Education(CAQA)

21 September University for Medical and Applied Sciences

Faculty of Engineering and Computer

Department of Information Technology

Program of Information Technology

Course Specification of

Decision Support Systems

Course Code (07.01. 723)

2024

T4: This Template is Developed and Approvedby CAQA-Yemen, 2023

Prepared by:	Reviewed by:	Head of the Department:	Quality Unit:	Dean
Prof. Ahmed Sultan Al-Hegami	Dr. -----			

I. General Information:

1.	Course Title:	Decision Support System				
2.	Course Code:	07.01. 723				
3.	Credit Hours:	Credit Hours	Theory ContactHours		Practical ContactHours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		2	2	--	--	--
4.	Level/ Semester at which this Course is offered:	4th Level / first Semester				
5.	Pre –Requisite (if any):	-----				
6.	Co –Requisite (if any):	------				
7.	Program (s) in which the Course is Offered:	Bachelor of Science in Medical Information Technology				
8.	Language of Teaching the Course:	English				
9.	Location of Teaching the Course:	Faculty of Medical Technology				
10.	Prepared by:	Prof. Ahmed Sultan Al-Hegami				
11	Date and Number of Approval by Council:					

II. Course Description:

The course introduces the basic and advanced concepts of decision support systems. It covers the decision making process, decision making and support systems (DSS), modeling and support, categorization of problem-solving techniques, data management and concepts of the data warehousing, modeling of management problems; decision analysis and forecasting models and simulation models, knowledge-based systems and expert systems, expert system architecture, representation of knowledge, forward and backward chaining, inferences making process, applications of expert systems in decision making, group, distributed, and executive decision support systems.

III. Course Intended Learning Outcomes (CILOs): Upon successful completion of the course, students will be able to:		Referenced PILOs		
	A. Knowledge and Understanding:	**I,P or M/A**		
a1	Recognize and understanding of fundamental and advanced concepts of Decision Support System (DSS), its applications.	I	A1	Demonstrate an understanding of appropriate models, theories, mathematical foundations, and techniques related to Health Information Technology discipline
a2	Describe the advanced techniques of Decision Support Systems		A4	Demonstrate a sound understanding the computing concept related to analysis, design, implementation, and evaluation of Health information system
	B. Intellectual Skills:			
b1	Formulate and solve DSS tasks for real-world data.		B1	Critically analyze complex computing problems and propose appropriate information technology based solutions and integrate them effectively into the uses and organization Health
b2	Assess the applicability of the technology for a particular scientific problem area, and		B2	Analyze the impacts of computing on Health objectives and

	develop the scientific methods used.			customer needs, and consider them during the analytical processing, selection, integration, configuration and administration of information systems
			B3	
	C. Professional and Practical Skills:			
c1	Follow research and development in the area to solve real Decision Support System problems by using the right tools and algorithms.		C1	Employ effectively the concepts, principles of computational tools, techniques used for the construction and documentation of Health Information of varying complexity
c2	Implement the main techniques of Decision Support System in a computationally efficient way		C2	design, implement, and test a computing-based solution to meet a given set of computing requirement in the context of Health Information Technology
			C3	
	D. Transferable Skills:			
d1	Conduct a novel research in the area of study according to rigorous criteria to peers and the community.		D1	Function effectively as an individual, as a member, or leader of a team engaged in activities appropriate to the Health Information Technology discipline to accomplish a common goal
d2	Learn independently and search for relevant information to write reports to recommend appropriate DSS tools.		D2	Commit to professional ethics, responsibilities, and norms of professional IT practices
			D3	
I= Introduced, P=Practiced or M/A= Mastered/Advanced				

	(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies andAssessment Methods:		
	Course Intended Learning	Teaching Strategies	Assessment Strategies

	Outcomes		
a1	Recognize and understanding of fundamental and advanced concepts of Decision Support System, its applications.	- Interactive lectures, - Problem solving, - Tutorials - Interactive Class Discussions, - Directed Self- Study,	- Coursework Activities - Written tests - Home works and assignments. - Presentations
a2	Describe the advanced techniques of Decision Support Systems	• Interactive lectures, • Problem solving, • Tutorials, • Interactive Class Discussions, • Directed Self- Study, • Exercises and Home Works,	• Coursework Activities • Written tests • Report/Project/ Practical Lab Sessions • Home works and assignments. • Presentations
		▪	▪

(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
b1	Formulate and solve DSS tasks for real-world data.	• Interactive lectures, • Problem solving, • Tutorials, • Laboratory based session, • Interactive Class Discussions, • Directed Self- Study,	• Written assessments such as multiple-choice questions and Quizzes • Report/Project/ Practical Lab Sessions • Home works and assignments. • Presentations
b2	Assess the applicability of the technology for a particular scientific problem area, and develop the scientific methods	• Interactive lectures, • Tutorials, • Seminar/ Project/Presentation,	• Coursework Activities • Report/Project/ Practical Lab Sessions

	used.	• Teamwork, • Laboratory based session, • Exercises and Home Works,	• Home works and assignments. • Presentations
	…	▪	▪
		▪	▪
		▪	▪

(C) Alignment of Course Intended Learning Outcomes (Professional and Practical Skills) to Teaching Strategies and Assessment Methods:

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
c1	Follow research and development in the area to solve real Decision Support System problems by using the right tools and algorithms.	• Interactive lectures, • Tutorials, • Seminar/ Project/Presentation, • Teamwork, • Directed Self-Study, • Exercises and Home Works,	• Coursework Activities • Written tests • Written assessments such as multiple-choice questions and Quizzes • Presentations
c2	Implement the main techniques of Decision Support System in a computationally efficient way	• Problem solving, • Tutorials, • Teamwork, • Laboratory based session, • Exercises and Home Works,	• Coursework Activities • Written assessments such as multiple-choice questions and Quizzes • Report/Project/ Practical Lab Sessions
	…	▪	▪

		▪	▪

	(D) Alignment of Course Intended Learning Outcomes (Transferable Skills) to Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
d1	Conduct a novel research in the area of study according to rigorous criteria to peers and the community.	• Interactive lectures, • Problem solving, • Tutorials, • Seminar/ Project/Presentation, • Teamwork, • Laboratory based session, • Interactive Class Discussions, • Directed Self-Study,	• Coursework Activities • Report/Project/ Practical Lab Sessions • Home works and assignments. • Presentations
d2	Learn independently and search for relevant information to write reports to recommend appropriate DSS tools.	• Problem solving, • Seminar/ Project/Presentation, • Teamwork, • Laboratory based session, • Interactive Class Discussions, • Directed Self-Study,	• Coursework Activities • Written tests • Report/Project/ Practical Lab Sessions • Home works and assignments. • Presentations
	…	▪	▪

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Preliminaries and Overview	■ Definition of DSS ■ Structure of decision systems ■ DSS models ■ Phases of decision making ■ Decision makers ■ Modeling and analysis strategies ■ Continuum if decision structures	2	4	a1, a2
2	DSS and Data Warehousing	■ Definition of DSS ■ Data Warehouse vs. Traditional Databases. ■ Characteristics of Data Warehouses. ■ Data Modeling for Data Warehouses. ■ Data Warehouse Architecture. ■ Building Data Warehouse. ■ Functionality of Data Warehouses (OLAP Operations). ■ Data Warehouse Usage ■ Problems and Open Issues in Data Warehousing.	2	4	a2, b2, c1, c2 ,d1
3	Decision Analysis	■ Introduction to decision analysis. ■ Decision making under uncertainty. ■ Decision making under risk ■ Decision making with perfect information ■ Decision making with imperfect information ■ Decision tress ■ Decision making and utility. ■ Decision making in light of competitive actions.	3	6	a2, b1, c1, c2, d1
4	**Mid-Term Exam**	Exam	1	2	ALL
5	Forecasting	■ Definitions ■ Forecasting types ■ Time series ■ Stationary forecasting models ■ Performance of forecasting methods ■ Linear trend time series ■ Trend, Seasonal and Cyclical time series ■ Associative forecasting	2	4	a2, b2, c1, c2 ,d1
6		■ What is simulation? ■ Advantages and Disadvantages of Simulation	2		a2, b2, c1, c2 ,d2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
	Simulation	■ Monte Carlo Simulation ■ Simulation of a Queuing Problem ■ Simulation and Inventory Analysis.		4	
7	Intelligent Decision support systems	■ Definitions ■ Architecture of intelligent DSS ■ representation of knowledge ■ inferences making process ■ Design of Intelligent DSS ■ Applications of expert systems in decision making. ■ group, distributed, and executive decision support systems.	2	4	a1,a2, b1, c1, d1,d2
8	**Seminar**	Students present their work.	1	2	b1,c1,c2, d2
9	**Final exam**	Exam	1	2	ALL
Number of Weeks /and Units Per Semester			16	32	

B. Practical Aspect (Lab/Clinical) (if any):

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1				
2				
3				
4				
5				

No.	Tasks/ Experiments	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
6				
7				
8				
9				
Number of Weeks /and Units Per Semester		15	30	

C. Tutorial Aspect (if any):

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
Number of Weeks /and Units Per Semester				

VII. Assignments:

No.	Assignments	Week Due	Mark	Aligned CILOs(symbols)
1	Assignment 1	4th	5	a1,b1,d1
2	Assignment 2	8th	5	a2,b2,c2,d2
Total			10	

VIII. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Assignments	4th ،8th	10	10%	a1, a2,b1 ,b2,c2, d1,d2
2	Mid Term Exam	8th	10	10%	a1,a2,b1,b2
3	Students presentations	15th	20	20%	b1,c1,c2, d2
4	Final Exam	16th	60	60%	All CILOs
Total			100	100%	

IX. Learning Resources:

- *Written in the following order:* Author, Year of publication, Title, Edition, Place of publication, Publisher.

1- Required Textbook(s) (maximum two):

1. Efraim Turban, Ramesh Sharda and Dursun Delen, Decision Support Systems and Business Intelligence systems, Prentice Hall, 9th edition, 2011.

2- Essential References:
1. John A. Lawrence and Barry A. Pasternack, Applied Management Science: A Computer-Integrated Approach for Decision Making, Wiley Text Books, 2nd edition 2002, ISBN 0471391905 2. J. Han and M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, July 6, 2011
3- Electronic Materials and Web Sites etc.:
1- http://www.sciencedirect.com/ 2- http://dl.acm.org/dl.cfm 3- http://ieeexplore.ieee.org/Xplore/guesthome.jsp 4- http://www.emeraldinsight.com 5- http://www.scopus.com/home.url 6- http://link.springer.com/ 7- http://search.proquest.com/

X. Course Policies: (Based on the Uniform Students' By law (2007)	
1	**Class Attendance:** Class Attendance is mandatory. A student is considered absent and shall be banned from taking the final exam if his/her absence exceeds 25% of total classes.
2	**Tardiness:** A student will be considered late if he/she is not in class after 10 minutes of the start time of class.
3	**Exam Attendance/Punctuality:** No student shall be allowed to the exam hall after 30 minutes of the start time, and shall not leave the hall before half of the exam time has passed.
4	**Assignments & Projects:** Assignments and projects must be submitted on time. Students who delay their assignments or projects shall lose the mark allocated for the same.
5	**Cheating:** Cheating is an act of fraud that results in the cancelation of the student's exam or assignment. If it takes place in a final exam, the penalties stipulated for in the Uniform Students' Bylaw (2007) shall apply.
6	**Forgery and Impersonation:** Forgery/Impersonation is an act of fraud that results in the cancelation of the student's exam, assignment or project. If it takes place in a final exam, the penalties

	stipulated for in the Uniform Students' Bylaw (2007) shall apply.
7	**Other policies:** The University official regulations in force will be strictly observed and students shall comply with all rules and regulations of the examination set by the Department, Faculty and University Administration.

Republic of Yemen
Ministry of Higher Education & Scientific Research
University: 21 September University for Medical & Applied Sciences

الجمهورية اليمنية
وزارة التعليم العالي والبحث العلمي
جامعة: جامعة 21سبتمبر للعلوم الطبية والتطبيقية

Faculty of Medical Technology

Department of Medical Information Technology

Program of Medical Information Technology

Course Plan (Syllabus) of **Decision Support Systems**

Course Code (07.01. 723)

I. Information about Faculty Member Responsible for the Course:								
Name of Faculty Member:		Office Hours						
Location& Telephone No.:	––							
E-mail:	--@–.–	SAT	SUN	MON	TUE	WED	THU	

2025/2024

II. Course Identification and General Information:

1	Course Title:	Decision Support System			
2	Course Code & Number:	07.01. 723			
3	Credit Hours:	Credit Hours	TheoryHours		Lab. Hours
			Lecture	Exercise	
		2	2	--	--
4	Study Level/ Semester at which this Course is offered:	4th Level / first Semester			
5	Pre –Requisite (if any):	-----			
6	Co –Requisite (if any):	None			
7	Program (s) in which the Course is Offered:	Bachelor of Science in Medical Information Technology			
8	Language of Teaching the Course:	English			
9	Study System:	Credit Hour System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medical Technology			
12	Prepared by:	Prof. Ahmed Sultan Al-Hegami			
13	Date of Approval:				

III. Course Description:

The course introduces the basic and advanced concepts of decision support systems. It covers the decision making process, decision making and support systems (DSS), modeling and support, categorization of problem-solving techniques, data management and concepts of the data warehousing, modeling of management problems; decision analysis and forecasting models and simulation models, knowledge-based systems and expert systems, expert system architecture, representation of knowledge, forward and backward chaining, inferences making process, applications of expert systems in decision making, group, distributed, and executive decision support systems.

IV. Course Intended Learning Outcomes (CILOs) :

Upon successful completion of the Course, student will be able to:

	A. **Knowledge and Understanding:**
a1	Recognize and understanding of fundamental and advanced concepts of Decision Support System (DSS), its applications.
a2	Describe the advanced techniques of Decision Support Systems
	B. **Intellectual Skills:**
b1	Formulate and solve DSS tasks for real-world data.
b2	Assess the applicability of the technology for a particular scientific problem area, and develop the scientific methods used.
	C. Professional and Practical Skills:
c1	Follow research and development in the area to solve real Decision Support System problems by using the right tools and algorithms.
c2	Implement the main techniques of Decision Support System in a computationally efficient way

D. Transferable Skills:	
d1	Conduct a novel research in the area of study according to rigorous criteria to peers and the community.
d2	Learn independently and search for relevant information to write reports to recommend appropriate DSS tools.

V. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
1	Preliminaries and Overview	■ Definition of DSS ■ Structure of decision systems ■ DSS models ■ Phases of decision making ■ Decision makers ■ Modeling and analysis strategies ■ Continuum if decision structures	2	4
2	DSS and Data Warehousing	■ Definition of DSS ■ Data Warehouse vs. Traditional Databases. ■ Characteristics of Data Warehouses. ■ Data Modeling for Data Warehouses. ■ Data Warehouse Architecture. ■ Building Data Warehouse. ■ Functionality of Data Warehouses (OLAP Operations). ■ Data Warehouse Usage ■ Problems and Open Issues in Data Warehousing.	2	4
3	Decision Analysis	■ Introduction to decision analysis. ■ Decision making under uncertainty. ■ Decision making under risk ■ Decision making with perfect information ■ Decision making with imperfect information ■ Decision tress ■ Decision making and utility. ■ Decision making in light of competitive actions.	3	6
4	**Mid-Term Exam**	Exam	1	2

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours
5	Forecasting	■ Definitions ■ Forecasting types ■ Time series ■ Stationary forecasting models ■ Performance of forecasting methods ■ Linear trend time series ■ Trend, Seasonal and Cyclical time series ■ Associative forecasting	2	4
6	Simulation	■ What is simulation? ■ Advantages and Disadvantages of Simulation ■ Monte Carlo Simulation ■ Simulation of a Queuing Problem ■ Simulation and Inventory Analysis.	2	4
7	Intelligent Decision support systems	■ Definitions ■ Architecture of intelligent DSS ■ representation of knowledge ■ inferences making process ■ Design of Intelligent DSS ■ Applications of expert systems in decision making. ■ group, distributed, and executive decision support systems.	2	4
8	**Seminar**	Students present their work.	1	2
9	**Final exam**	Exam	1	2
10				
Number of Weeks /and Units Per Semester			16	32

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Week Due	Contact Hours

No.	Tasks/ Experiments	Week Due	Contact Hours
1			
2			
3			
4			
5			
6			
7			
8			
9			
Number of Weeks /and Units Per Semester		15	30

No.	Tasks/ Experiments	Week Due	Contact Hours
1			
2			
3	-		
4	-		
5	-		
6	-		
7	-		
8	-		
9			
10	-		
11	-		

No.	Tasks/ Experiments	Week Due	Contact Hours
12	-		
13	-		
14	-		
15			
16			
Number of Weeks /and Units Per Semester			

C. Tutorial Aspect:

No.	Tutorial	Number of Weeks	Contact Hours
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Number of Weeks /and Units Per Semester			

VI. Teaching Strategies of the Course:

- Interactive lectures,
- Problem solving,
- Tutorials.

- Seminar/ Project/Presentation,
- Teamwork,
- Laboratory based session,
- Interactive Class Discussions,
- Directed Self- Study,
- Exercises and Home Works,

VII. Assessment Methods of the Course:

- Coursework Activities
- Written tests
- Written assessments such as multiple-choice questions and Quizzes
- Report/Project/ Practical Lab Sessions
- Home works and assignments.
- Presentations

VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Assignment 1	4th	5
2	Assignment 2	8th	5
3			
Total			10

IX. Schedule of Assessment Tasks for Students During the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	4th ,8th	10	10%
2	Mid Term Exam	8th	10	10%
3	Students presentations	15th	20	20%

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
4	Final Exam	16th	60	60%
8				
Total			100	100%

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1				
2				
3				
4				
5				
6				
Total				

X. Learning Resources:

- *Written in the following order: Author, Year of publication, Title, Edition, Place of publication, Publisher.*

1- Required Textbook(s) (maximum two):

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2- Essential References:

1- John A. Lawrence and Barry A. Pasternack, Applied Management Science: A Computer-Integrated

Approach for Decision Making, Wiley Text Books, 2nd edition 2002, ISBN 0471391905

2- J. Han and M. Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann, July 6, 2011

3- Electronic Materials and Web Sites etc.:

1- http://www.sciencedirect.com/
2- http://dl.acm.org/dl.cfm

3- http://ieeexplore.ieee.org/Xplore/guesthome.jsp
4- http://www.emeraldinsight.com
5- http://www.scopus.com/home.url
6- http://link.springer.com/
7- http://search.proquest.com/

XI. Course Policies: (Based on the Uniform Students' Bylaw (2007)

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