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

Medical Coding and Billing

Course Code. (07.01.719)

2024

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

Prepared by:	Reviewed by:	Head of the Department:	Quality Unit:	Dean
Dr. ---------	Dr. -----			

I. General Information:

1.	Course Title:	Medical Coding and Billing				
2.	Course Code:	07.01.719				
3.	Credit Hours:	Credit Hours	Theory Contact Hours		Practical Contact Hours	
			Lecture	Tutorial/ Seminar	Lab	Clinical
		3	3	--	--	--
4.	Level/ Semester at which this Course is offered:	3 Level / 1 Semester				
5.	Pre –Requisite (if any):	Health Information Technology				
6.	Co –Requisite (if any):	Non				
7.	Program (s) in which the Course is Offered:	Bachelor of Information Technology				
8.	Language of Teaching the Course:	English/Arabic				
9.	Location of Teaching the Course:	Faculty of Medical Technology				
10.	Prepared by:	Dr. Abdulrahman Mohammed Hussein Obaid				
11	Date and Number of Approval by Council:					

II. Course Description:

Medical Coding and Billing aims to develop proficiency in medical coding and billing practices, essential for accurate healthcare reimbursement and data management. It covers fundamental principles of healthcare classification systems, including ICD-10-CM, CPT, and HCPCS, as well as insurance claim processing and healthcare revenue cycle management. The course focuses on hands-on application of coding guidelines, electronic health record systems, and billing software, preparing students for real-world scenarios in healthcare administration. Students will gain practical skills in code assignment, claim submission, and compliance with healthcare regulations, enhancing their employability in medical offices, hospitals, and insurance companies.

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	Explain the fundamental concepts, theories, and techniques of medical coding and billing within the Health Information Technology discipline.		A1	Demonstrate an understanding of appropriate models, theories, mathematical foundations, and techniques related to Health Information Technology discipline.
a2	Identify healthcare providers' and payers' needs to propose appropriate IT-based solutions for medical coding and billing challenges.		A2	Identify user and Healthcare needs to provide IT based solutions to real-world problem.
a3			A3	
a4	Describe the role of medical coding and billing in the analysis, design, implementation, and evaluation of health information systems.		A4	Demonstrate a sound understanding the computing concept related to analysis, design, implementation, and evaluation of Health information system.

	B. Cognitive/ Intellectual Skills:			
b1	Analyze complex coding and billing scenarios and develop appropriate technology-based solutions for integration into healthcare organizations.			
b2	Evaluate the impact of coding and billing practices on healthcare objectives and patient needs within the context of health information systems.		**B2**	Analyze the impacts of computing on Health objectives and customer needs, and consider them during the analytical processing, selection, integration, configuration and administration of information systems
b3	Investigate various challenges in medical coding and billing to determine optimal solutions using health information technology.		**B3**	Explore variety of challenges and problems related to Health Information Technology to select the optimal solution.
	C. Practical and Professional Skills:			
c1	Apply effectively the concepts and principles of computational tools for accurate medical coding and documentation of health information.		**C1**	Employ effectively the concepts, principles of computational tools, techniques used for the construction and documentation of Health Information of varying complexity.
c2				
c3				
c4	Utilize current coding software, electronic health record systems, and billing tools necessary for		**C4**	Use current techniques, skills, and tools necessary for computing practices.

	professional medical coding and billing practices.			
	D. General and Transferable Skills:			
d1			**D1**	
d2			**D2**	
d3			**D3**	
I= Introduced, P=Practiced or M/A= Mastered/Advanced				

	(A) Alignment of Course Intended Learning Outcomes (Knowledge and Understanding) to Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
a1	Explain core concepts, models, and theories in Health Information Technology, including their mathematical foundations.	▪ Lectures ▪ Discussion ▪ Presentation ▪ Self-learning	▪ Written exam (mid and final terms and quizzes) ▪ Final practical exam ▪ Assignments
a2	Identify healthcare user needs and propose appropriate IT-based solutions for real-world healthcare problems.	▪ Lectures ▪ Discussion ▪ Presentation ▪ Self-learning	▪ Written exam (mid and final terms and quizzes) ▪ Final practical exam ▪ Assignments
a3	Demonstrate knowledge in IT tools and techniques to address complex computing challenges in healthcare environments.	▪ Lectures ▪ Discussion ▪ Presentation ▪ Self-learning	▪ Written exam (mid and final terms and quizzes) ▪ Final practical exam ▪ Assignments
a4	Describe the process of analysis, design, implementation, and evaluation of health information systems.	▪	▪
	(B) Alignment of Course Intended Learning Outcomes (Intellectual Skills) to		

	Teaching Strategies and Assessment Methods:		
	Course Intended Learning Outcomes	**Teaching Strategies**	**Assessment Strategies**
b1		▪ Lectures ▪ Tutorials ▪ Discussion ▪ Case studies (CBL) ▪ Self-Learning ▪ Problem Based Learning (PBL)	▪ Written exam (mid and final terms and quizzes) ▪ Final practical exam ▪ Assignments
b2	Evaluate the impact of health information systems on healthcare objectives and patient needs.	▪	▪
b3	Investigate various challenges in Health Information Technology, selecting optimal solutions.	▪	▪
		▪	▪
		▪	▪

	(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	Utilize computational tools and techniques effectively for constructing and documenting complex health information systems.	▪	▪
c2		▪ Tutorials ▪ Training ▪ Case studies (CBL) ▪ Lab work ▪ Problem Solving Learning (PSL) ▪ Problem Based Learning (PBL)	▪ Written exam (mid and final terms and quizzes) ▪ Final practical exam ▪ Assignments
		▪	▪
c4	Using current health informatics tools,	▪ Tutorials ▪ Training ▪ Case studies (CBL)	▪ Written exam (mid and final terms and quizzes)

	techniques, and skills for professional computing practices in healthcare.	▪ Lab work ▪ Problem Solving Learning (PSL) ▪ Problem Based Learning (PBL)	▪ Final practical exam ▪ Assignments

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

	Course Intended Learning Outcomes	Teaching Strategies	Assessment Strategies
d1		▪	▪
d2		▪	▪
	…	▪	▪

IV. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to Medical Coding and Billing	• Overview of healthcare reimbursement • Role of coding in healthcare • Regulatory compliance (HIPAA, HITECH)	1	2	1, 3
2	Fundamentals of ICD-10-CM	• ICD-10-CM structure and conventions • Guidelines for coding and reporting • Chapter-specific coding rules	2	4	1, 7
3	CPT Coding System	• CPT code structure and guidelines • Evaluation and Management (E/M) coding • Procedural coding	2	4	1, 7
4	HCPCS Level II Coding	• HCPCS Level II structure and purpose • Coding for supplies, materials, and services	1	2	1, 7

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
		• Modifiers in HCPCS			
5	Medical Necessity and Documentation	• Defining medical necessity • Documentation requirements • Electronic Health Records (EHR) and coding	1	2	2, 3, 5
6	Healthcare Insurance and Claims Processing	• Types of health insurance plans • Claim form completion (CMS-1500, UB-04) • Electronic claim submission	1	2	2, 4, 8
7	Midterm Exam	•Review and assessment	1	2	1, 2, 3, 4, 5
8	Revenue Cycle Management	• Components of the revenue cycle • Key performance indicators • Technology in revenue cycle management	1	2	3, 4, 5
9	Compliance and Auditing	• Coding compliance programs • Internal and external audits • Handling denials and appeals	1	2	4, 6, 7
10	Reimbursement Methodologies	• Fee-for-service • Prospective payment systems • Value-based reimbursement	1	2	2, 5, 6
11	Health Information Technology in Coding and Billing	• Computer-assisted coding (CAC) • Billing software systems • Interoperability and data exchange	1	2	3, 7, 8
12	Ethical and Legal Considerations	• Ethical coding practices • Fraud and abuse prevention • Privacy and security of health information	1	2	1, 5, 6
13	Emerging Trends in Medical Coding and Billing	• AI and machine learning in coding • Telehealth coding and billing • Future of healthcare reimbursement	1	2	2, 6, 8

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
14	Final Exam	•Comprehensive assessment	1	2	1, 2, 3, 4, 5, 6, 7, 8
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				
6				
7				
8				
Number of Weeks /and Units Per Semester				

C. Tutorial Aspect (if any):

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

No.	Tutorial	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
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	Exercises and Home Works, Problem Solving (I)	3	3	a1,a2,a3,
2	Exercises and Home Works, Problem Solving (II)	9	3	a2,b1,b4,c2
3	Technical Report and Presentation.	11	4	a4,c3,d1
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	3,8,11	10	10 %	a1, a2, b1,b2,b3,c1,d1,d3
2	Quizzes 1 & 2	6,12	5	5 %	a1,a2, b1,b2,c1
3	Mid-Term Theoretical Exam	9	10	10 %	a1,a2, b1,b2,c1
4	Mid-Term Practical Exam	7	5	5 %	a1, a2, b1 ,c1
5	Final Practical Exam including Project Presentation & Evaluation	15	10	10 %	a1, a2, b1,b2 ,c1
6	Final Theoretical Exam	16	60	60 %	a1, a2, c1,b1,b2,b3
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. Buck, C.J. (2024). Step-by-Step Medical Coding, 2025 Edition. St. Louis, Elsevier.
2. Safian, S.C. (2023). Understanding Health Insurance: A Guide to Billing and Reimbursement, 16th Edition. Boston, Cengage Learning.

2- Essential References:

1. Bowie, M.J., & Schaffer, R. (2024). Understanding ICD-10-CM and ICD-10-PCS: A Worktext, 6th Edition. Burlington, Jones & Bartlett Learning.
2. Green, M.A., & Rowell, J.C. (2023). Understanding Health Insurance: A Guide to Billing and Reimbursement, 15th Edition. Boston, Cengage Learning.
3. Proctor, D.B., & Young-Adams, A.P. (2023). Kinn's The Medical Assistant: An Applied Learning Approach, 14th Edition. St. Louis, Elsevier.

3- Electronic Materials and Web Sites etc.:

Websites:

1. www.cms.gov - Centers for Medicare & Medicaid Services
2. www.aapc.com - American Academy of Professional Coders
3. www.ahima.org - American Health Information Management Association

Journals:

1. Journal of AHIMA (American Health Information Management Association)
2. Journal of Medical Practice Management

Other Web Sources:

1. www.medicalbillingandcoding.org - Medical Billing and Coding Online
2. www.who.int/classifications/icd/en/ - World Health Organization ICD Information

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

Health Information Technology

Course Code. 07.01.704

I. Information about Faculty Member Responsible for the Course:							
Name of Faculty Member:	Dr. Abdulrahman Mohammed Obaid	Office Hours					
Location& Telephone No.:	00967773574322						
E-mail:	Obaid.eng@gmail.com	SAT	SUN	MON	TUE	WED	THU

2024

II. Course Identification and General Information:

1	Course Title:	Medical Coding and Billing			
2	Course Code & Number:	07.01.719			
3	Credit Hours:	Credit Hours	Theory Hours		Lab. Hours
			Lecture	Exercise	
		3	3	--	--
4	Study Level/ Semester at which this Course is offered:	3 Level / 1 Semester			
5	Pre –Requisite (if any):	Health Information Technology			
6	Co –Requisite (if any):	Non			
7	Program (s) in which the Course is Offered:	Bachelor of Information Technology			
8	Language of Teaching the Course:	English/Arabic			
9	Study System:	Semester Based System			
10	Mode of Delivery:	Full Time			
11	Location of Teaching the Course:	Faculty of Medical Technology			
12	Prepared by:	Dr. Abdulrahman Mohammed Hussein Obaid			
13	Date of Approval:				

III. Course Description:

Medical Coding and Billing aims to develop proficiency in medical coding and billing practices, essential for accurate healthcare reimbursement and data management. It covers fundamental principles of healthcare classification systems, including ICD-10-CM, CPT, and HCPCS, as well as insurance claim processing and healthcare revenue cycle management. The course focuses on hands-on application of coding guidelines, electronic health record systems, and billing software, preparing students for real-world

scenarios in healthcare administration. Students will gain practical skills in code assignment, claim submission, and compliance with healthcare regulations, enhancing their employability in medical offices, hospitals, and insurance companies.	

IV. Course Intended Learning Outcomes (CILOs) :

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

	A. **Knowledge and Understanding:**
a1	Explain the fundamental concepts, theories, and techniques of medical coding and billing within the Health Information Technology discipline.
a2	Identify healthcare providers' and payers' needs to propose appropriate IT-based solutions for medical coding and billing challenges.
a3	
a4	Describe the role of medical coding and billing in the analysis, design, implementation, and evaluation of health information systems.
	B. Cognitive/ Intellectual Skills:
b1	Analyze complex coding and billing scenarios and develop appropriate technology-based solutions for integration into healthcare organizations.
b2	Evaluate the impact of coding and billing practices on healthcare objectives and patient needs within the context of health information systems.
b3	Investigate various challenges in medical coding and billing to determine optimal solutions using health information technology.
	C. Practical and Professional Skills:
c1	Apply effectively the concepts and principles of computational tools for accurate medical coding and documentation of health information.
c2	
c4	Utilize current coding software, electronic health record systems, and billing tools necessary for professional medical coding and billing practices.
	D. Transferable Skills:

d1	
d2	

V. Course Contents:

A. Theoretical Aspect:

No.	Units/Topics List	Sub Topics List	Number of Weeks	Contact Hours	Learning Outcomes (CILOs)
1	Introduction to Medical Coding and Billing	• Overview of healthcare reimbursement • Role of coding in healthcare • Regulatory compliance (HIPAA, HITECH)	1	2	1, 3
2	Fundamentals of ICD-10-CM	• ICD-10-CM structure and conventions • Guidelines for coding and reporting • Chapter-specific coding rules	2	4	1, 7
3	CPT Coding System	• CPT code structure and guidelines • Evaluation and Management (E/M) coding • Procedural coding	2	4	1, 7
4	HCPCS Level II Coding	• HCPCS Level II structure and purpose • Coding for supplies, materials, and services • Modifiers in HCPCS	1	2	1, 7
5	Medical Necessity and Documentation	• Defining medical necessity • Documentation requirements • Electronic Health Records (EHR) and coding	1	2	2, 3, 5

6	Healthcare Insurance and Claims Processing	• Types of health insurance plans • Claim form completion (CMS-1500, UB-04) • Electronic claim submission	1	2	2, 4, 8
7	Midterm Exam	•Review and assessment	1	2	1, 2, 3, 4, 5
8	Revenue Cycle Management	• Components of the revenue cycle • Key performance indicators • Technology in revenue cycle management	1	2	3, 4, 5
9	Compliance and Auditing	• Coding compliance programs • Internal and external audits • Handling denials and appeals	1	2	4, 6, 7
10	Reimbursement Methodologies	• Fee-for-service • Prospective payment systems • Value-based reimbursement	1	2	2, 5, 6
11	Health Information Technology in Coding and Billing	• Computer-assisted coding (CAC) • Billing software systems • Interoperability and data exchange	1	2	3, 7, 8
12	Ethical and Legal Considerations	• Ethical coding practices • Fraud and abuse prevention • Privacy and security of health information	1	2	1, 5, 6
13	Emerging Trends in Medical Coding and Billing	• AI and machine learning in coding • Telehealth coding and billing • Future of healthcare reimbursement	1	2	2, 6, 8
14	Final Exam	•Comprehensive assessment	1	2	1, 2, 3, 4, 5, 6, 7, 8
Number of Weeks /and Units Per Semester			**16**	**32**	

B. Case Studies and Practical Aspect:

No.	Tasks/ Experiments	Number of	Contact	Learning

		Weeks	Hours	Outcomes (CILOs)
1				
2				
3				
4				
5				
6				
7				
8				
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:

Knowledge and Understanding Skills is developed through:

- Lectures
- Discussion
- Presentation
- Self-learning

Intellectual Skills are developed through:

- Lectures
- Tutorials
- Discussion
- Case studies (CBL)
- Self-Learning
- Problem Based Learning (PBL)

Practical and professional Skills are developed through:

- Tutorials
- Training
- Case studies (CBL)
- Problem Solving Learning (PSL)
- Problem Based Learning (PBL)

General/Transferrable Skills are developed through:

- Discussion
- Case studies (CBL)
- Self-Learning
- Presentation

VII. Assessment Methods of the Course:

- Written exam (mid and final terms and quizzes),
- Final practical exam

Assignments

VIII. Assignments:

No.	Assignments	Week Due	Mark
1	Exercises and Home Works, Problem Solving (I)	3	3
2	Exercises and Home Works, Problem Solving (II)	9	3
3	Technical Report and Presentation.	11	4
Total			10

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

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1	Assignments	3,8,11	10	10 %
2	Quizzes 1 & 2	6,12	5	5 %
3	Mid-Term Theoretical Exam	9	10	10 %
4	Mid-Term Practical Exam	7	5	5 %
5	Final Practical Exam including Project Presentation & Evaluation	15	10	10 %
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3. Proctor, D.B., & Young-Adams, A.P. (2023). Kinn's The Medical Assistant: An Applied Learning Approach, 14th Edition. St. Louis, Elsevier.

3- Electronic Materials and Web Sites etc.:

Websites:

1. www.himss.org - Healthcare Information and Management Systems Society
2. www.amia.org - American Medical Informatics Association
3. www.healthit.gov - The Office of the National Coordinator for Health Information Technology

Journals:

1. Journal of the American Medical Informatics Association
2. International Journal of Medical Informatics

Other Web Sources:

1. www.coursera.org/specializations/health-informatics - Health Informatics Specialization (Coursera)
2. www.edx.org/course/introduction-to-health-informatics - Introduction to Health Informatics (edX)

Websites:

1. www.himss.org - Healthcare Information and Management Systems Society
2. www.amia.org - American Medical Informatics Association
3. www.healthit.gov - The Office of the National Coordinator for Health Information Technology

Journals:

1. Journal of the American Medical Informatics Association
2. International Journal of Medical Informatics

Other Web Sources:

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2. www.edx.org/course/introduction-to-health-informatics - Introduction to Health Informatics (edX)

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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.