

Republic of Yemen

Ministry of Higher Education & Scientific Research

21 SEPTEMBER UNIVERSITY of MEDICALS & APPLIED

SCIENCES



Program Anesthesia Technician

Course Specification of Electrocardiographic

Course No. (01 02 844)

2024

Prepared by:	Reviewed by:	Head of the Department	Quality Unit	:	Dean
Dr. Ahmed AL-malahi	Dr fares Mahdi	Dr .fares Mahdi	Dr. Fadl Shujaa Al-deen		Dr Abdulsalam Dallak.

I. Course Identification and General Information:						
1	Course Title:	Electrocardiographic				
2	Course Code & Number:	(01.02.844)				
3	Credit hours:	Credit Hours				Total
		Th	Seminar	Prac	Train	
		2	-			2
4	Study level/ semester at which this course is offered:	Second year/first semester				
5	Pre –requisite (if any):	-				
6	Co –requisite (if any):	-				
7	Program(s) in which the course is offered	Anesthesia Technician				
8	Language of teaching the course:	English				
9	Location of teaching the course:	Faculty of Medical Applied Science				
10	System of Study:	Semester				
11	Mode of delivery:					
12	Prepared By:	Dr. Ahmed AL-malahi				
13	Date of Approval	2024				

II. Course Description
The course is electrocardiogram (ECG or EKG) course provides an in-depth understanding of cardiac electrophysiology and the interpretation of ECG readings. Participants will learn the fundamentals of the electrical activity of the heart, how to operate ECG machines, and the principles behind ECG signal acquisition.

III. Course Intended Learning Outcomes (CILOs) : (مخرجات تعلم المقرر)	Referenced PILOs (مخرجات تعلم البرنامج)
A. Knowledge and Understanding: Upon successful completion of the course, students will be able to:	
a1	Recognize and interpret normal ECG tracings, including heart rate, rhythm, and amplitude.
a2	: Distinguish between common arrhythmias,
	A1. Recognize the knowledge from nursing science, other sciences and disciplines to make judgments relative to the practice of nursing that is based on research findings and evidence.
	A2. Demonstrate comprehensive understanding

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	ischemic changes, and other pathologies reflected in ECG patterns.	of nursing theory and management principles in providing nursing care to client across the lifespan, and in all healthcare settings
a3	Demonstrate proficiency in setting up and using ECG machines, including lead placement and troubleshooting common issues.	A3. Identify the acute and chronic illness, and its effects on the bio-psychosocial functioning of individuals, families, and groups.
B. Intellectual Skills: Upon successful completion of the course, students will be able to:		
b1	Integrate theoretical knowledge into practical situations by interpreting ECGs in real-life case studies.	B1 Demonstrate skills in critical thinking, problem-solving and decision making in the use of the nursing process in a variety of healthcare settings.
b2	Evaluate how ECG interpretation can be used to inform treatment plans and improve patient outcomes	B2. Value the ideal of lifelong learning to support excellence in nursing practice
b3	Relate specific ECG findings to potential clinical conditions and understand their diagnostic significance	B3. Utilize awareness, interest and contribute towards advancement of self and of the profession
C. Professional and Practical Skills: Upon successful completion of the course, students will be able to:		
c1	Explain the fundamental concepts of ECG, including the cardiac conduction system and the significance of various segments and waves.	C1 Practice as a professional nurse to facilitate human need fulfillment of individuals, families, groups, communities and populations across the lifespan in a variety of healthcare settings
c2	Collaborate effectively with other healthcare	C2. Apply concepts and skills of leadership,

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	professionals in a clinical environment to enhance patient care related to cardiac health.	management, quality improvement and patient safety in the delivery of high-quality therapeutic nursing interventions for individuals, families, groups, communities
D. Transferable Skills: Upon successful completion of the course, students will be able to:		
d1	Encourage ongoing education in electrocardiography and its advancements through research and staying current with guidelines..	D1. Communicate effectively with individuals and groups and members of the health team in order to promote effective interpersonal relationships and teamwork
d2	Employ effective communication and accurate documentation while providing and/or managing for client needs.	D2. Demonstrate professional, ethical, moral, legal, and spiritual concepts into one's practice within a global environment

A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
A1. Recognize and interpret normal ECG tracings, including heart rate, rhythm, and amplitude.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
A2. Distinguish between common arrhythmias, ischemic changes, and other pathologies reflected in ECG patterns.	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
A3. Demonstrate proficiency in setting up and using ECG machines, including lead placement and troubleshooting common	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type

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issues.

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

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
b1. Encourage ongoing education in electrocardiography and its advancements through research and staying current with guidelines..	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
b2. Evaluate how ECG interpretation can be used to inform treatment plans and improve patient outcomes	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type
B3. Relate specific ECG findings to potential clinical conditions and understand their diagnostic significance	Lecture discussion Case discussion Brainstorming	Essay type Short answers Objective type

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

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
Explain the fundamental concepts of ECG, including the cardiac conduction system and the significance of various segments and waves.	Lab Practice Supervised Clinical practice	Evaluate with checklist Assess performance with rating scale Clinical exam
Collaborate effectively with other healthcare professionals in a clinical environment to enhance patient care related to cardiac health.	Lab Practice Supervised Clinical practice	Evaluate with checklist Assess performance with rating scale Clinical exam

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

Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1. Engage in educational activities related to professional issues.	Practice session Supervised clinical practice	Assess role plays with check-list on teaching techniques Assess health teaching with

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		checklist Assess performance with rating scale
d2. Employ effective communication and accurate documentation while providing and/or managing for client needs.	Practice session Supervised clinical practice	Assess role plays with the check-list on communication Assess communication techniques by rating scale Assess performance with rating scale

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours	Learning Outcomes
1	Introduction to Electrocardiography	History and evolution of ECG Basic principles of cardiac physiology Overview of the heart's electrical conduction system	1	2	a1, b1, c1,
2	Anatomy and Physiology of the Heart	Structure of the heart Overview of cardiac cycles and muscle contractions Blood flow through the heart and associated valves	1	2	a2, b2, c1, c2, d1, d2
3	ECG Basics	Understanding electrocardiograms : Leads and placement Components of the ECG wave: P wave, QRS complex, T wave Heart rate	1	2	a1, c1, c2, d1, d2

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		calculation and rhythm analysis			
4	ECG Waveforms and Intervals	Normal sinus rhythm Duration and significance of PR interval, QRS duration, and QT interval Common variations in waveforms	1	2	a3, c1, c2, d1, d2
5	ECG Lead Placement and Configuration	Standard lead placements (limb leads and precordial leads) Types of ECG leads: Bipolar, unipolar, augmented Importance of lead placement for accurate readings	2	4	a1, a2, c1, c2, d1, d2
6	Midterm exam	Midterm exam	1	2	a1, a2, a3, b2, b3, c1, c2, c1, d2
7	ECG Interpretation Skills	Systematic approach to reading ECGs Identifying normal vs abnormal rhythms Recognizing common arrhythmias: Atrial fibrillation, ventricular tachycardia	2	4	a2, a3, b3, c1, c2, d1, d2
8	Clinical Applications of Electrocardiography	Diagnostic role of ECG in various cardiac conditions Interpretation of stress tests and Holter monitoring ECG changes in ischemia and infarction	1	2	a3, b3, d1, d2
9	Advanced ECG Concepts	ECG in special populations (pediatrics, geriatrics, athletes)	2	4	a1, a2, c1, c2, d1, d2

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		Understanding ST segment changes and their implications Diagnostic criteria for specific cardiac conditions (e.g., hypertrophy, heart blocks)			
10	ECG and Electrolyte Imbalances	Effects of electrolyte disturbances on the ECG Understanding conditions such as hyperkalemia and hypokalemia ▪	1	2	a1, a3, b2, c1, c2
11	Hands-On Practice	Practical sessions on ECG lead placement and recording Case studies for real-world application Simulation of various arrhythmias and their identification Legal and Ethical Considerations ▪ Documentation and patient consent Ethical considerations in ECG interpretation and handling patient data Course Review and Examination ▪ Comprehensiverevi	2	4	a1, c1, c2, d1, d2

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		ew of topics covered Practical and theoretical assessments Certification or credentialing opportunities			
12	Final exam	Final exam	1	2	a1, a2, b1, b2, b3, c1, c2, d1, d2
Number of Weeks /and Units Per Semester			14	32	

B – Practical Aspect:

Order	Task/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
	Not applicable			
Number of Weeks /and Units Per Semester				

V. Teaching strategies of the course

1. Lecture – Discussion
2. Demonstration
3. Student assignment
4. Role Plays
5. Brainstorming
6. Case study
7. Field work

V. Assessments strategies of the course

Assess role plays with the check-list on communication
Assess communication techniques by rating scale
Assess performance with rating scale

VI. Assignments

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
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1	Performing health assessment and requesting diagnostic measures for three assigned patients	c1, c2, d1, d2	2	2.5
2	Write plan of management for three assigned patients	c1, c2, d1, d2	2	2.5

VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical Part

No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1, a2, b1, b2
2	Student assignments	5th and 12th week	5	5%	a1, a2, b3, b1, b2, b3
3	Mid-term exam	7th or 8th week	20	20%	a1, a2, b1, b2, c2, d2
4	Final-exam	16th-17th week	70	70 %	a1, a2, a3, b1, b2, c2, d2

Clinical Part

No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Not applicable				
Number of Weeks /and Units Per Semester					

VIII. Learning Resources:

Written in the following order: (Author; Year of publication; Title; Edition – Place of publication – Publisher).

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

1.	"Clinical ECG Interpretation: A to Z by Case" by Ken Grauer - This book provides case studies to teach clinicians how to interpret ECGs. It's comprehensive and easy to understand.
2.	"ECG Made Easy" by John R. Hampton - A user-friendly guide that breaks down ECG concepts into simple terms, ideal for beginners.

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	"The ECG Made Simple" by A. K. Bhargava & A. L. Bhargava - Another approachable resource emphasizing the fundamental aspects of ECG interpretation. .3 "12-Lead ECG in Acute Care" by J. Jeffers and A. D. Davis - Focused on the application of 12-lead ECGs in acute settings, this book is useful for emergency professionals. .4 .5
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2- Essential References.

المراجع المساندة

	"Electrocardiography in Clinical Practice" by P. K. Shah and E. A. Packer - A more advanced text that covers the clinical applications and interpretation of ECGs in various scenarios. .1 "Basic Arrhythmias" by Joseph T. Flynn and G. Bertelsen - This book provides insights into recognizing common arrhythmias through ECG readings. .2 "The ECG: A 2-in-1 Workbook" by A. R. W. Hinton and J. L. Hart - A workbook designed for practical learning that accompanies theoretical ECG study. .3 Online Resources and Courses - Websites like Medscape, ECG Wave-Maker, and the American Heart Association offer valuable online materials for ECG education. .4 Video Tutorials - Platforms like YouTube feature instructional videos on ECG interpretation from various healthcare professionals. .5
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3- Electronic Materials and Web Sites etc.

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	1. http://www.google.com
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IX. Course Policies:

الضوابط والسياسات المتبعة في المساق

1	Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	Tardy: any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	Exam Attendance/Punctuality: Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work
5	Cheating: Cheating by any means will cause the student failure and he/she must re-study the course
6	Plagiarism: Plagiarism by any means will cause the student failure in the

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	course. Other disciplinary procedures will be according to the college rules.
7	Other policies (سياسات أخرى): -

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Faculty of Medical Applied Science
Bachelor Anesthesia Technician

Course Specification of Electrocardiographic

Course No. (01.02.844)

2024

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Plan (Syllabus)

I. Course Identification and General Information:				
1	Course Title:	Electrocardiographic		
2	Course Code & Number:	(01.02.844)		
3	Credit hours:	Credit Hours		Total
		Th	Seminar	
		2	-	2
4	Study level/ semester at which this course is offered:	Third year/first semester		
5	Pre –requisite (if any):	-		
6	Co –requisite (if any):	-		
7	Program(s) in which the course is offered	Bachelor Anesthesia Technician		
8	Language of teaching the course:	English		
9	Location of teaching the course:	Faculty of Medical Applied Science		
10	System of Study:	Semester		
11	Mode of delivery:			
12	Prepared By:	Dr. Ahmed AL-malahi		
13	Date of Approval	2024		

II. Course Description

The course is electrocardiogram (ECG or EKG) course provides an in-depth understanding of cardiac electrophysiology and the interpretation of ECG readings. Participants will learn the fundamentals of the electrical activity of the heart, how to operate ECG machines, and the principles behind ECG signal acquisition

(مخرجات تعلم المقرر). Course Intended Learning Outcomes (CILOs) :

a1Recognize and interpret normal ECG tracings, including heart rate, rhythm, and amplitude.

a2 Distinguish between common arrhythmias, ischemic changes, and other pathologies reflected in ECG patterns.

a3Demonstrate proficiency in setting up and using ECG machines, including lead placement and troubleshooting common issues.

b1. Encourage ongoing education in electrocardiography and its advancements through research and staying current with guidelines..

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b2.Evaluate how ECG interpretation can be used to inform treatment plans and improve patient outcomes
B3.Relate specific ECG findings to potential clinical conditions and understand their diagnostic significance
C1Explain the fundamental concepts of ECG, including the cardiac conduction system and the significance of various segments and waves.
C2Collaborate effectively with other healthcare professionals in a clinical environment to enhance patient care related to cardiac health.
D1. Encourage ongoing education in electrocardiography and its advancements through research and staying current with guidelines..
D2 .Employ effective communication and accurate documentation while providing and/or managing for client needs.

IV. Course Content:					
A – Theoretical Aspect:					
Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours	Learning Outcomes
1	Introduction to Electrocardiography	History and evolution of ECG Basic principles of cardiac physiology Overview of the heart's electrical conduction system	1	2	a1, b1, c1,
2	Anatomy and Physiology of the Heart	Structure of the heart Overview of cardiac cycles and muscle contractions Blood flow through the heart and associated valves	1	2	a2, b2, c1, c2, d1, d2
3	ECG Basics	Understanding electrocardiograms : Leads and placement	1	2	a1, c1, c2, d1, d2

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		Components of the ECG wave: P wave, QRS complex, T wave Heart rate calculation and rhythm analysis			
4	ECG Waveforms and Intervals	Normal sinus rhythm Duration and significance of PR interval, QRS duration, and QT interval Common variations in waveforms	1	2	a3, c1, c2, d1, d2
5	ECG Lead Placement and Configuration	Standard lead placements (limb leads and precordial leads) Types of ECG leads: Bipolar, unipolar, augmented Importance of lead placement for accurate readings	2	4	a1, a2, c1, c2, d1, d2
6	Midterm exam	Midterm exam	1	2	a1, a2, a3, b2, b3, c1, c2, c1, d2
7	ECG Interpretation Skills	Systematic approach to reading ECGs Identifying normal vs abnormal rhythms Recognizing common arrhythmias: Atrial fibrillation, ventricular tachycardia	2	4	a2, a3, b3, c1, c2, d1, d2
8	Clinical Applications of Electrocardiography	Diagnostic role of ECG in various cardiac conditions Interpretation of stress tests and Holter monitoring ECG changes in ischemia and	1	2	a3, b3, d1, d2

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		infarction			
9	Advanced ECG Concepts	ECG in special populations (pediatrics, geriatrics, athletes) Understanding ST segment changes and their implications Diagnostic criteria for specific cardiac conditions (e.g., hypertrophy, heart blocks)	2	4	a1, a2, c1, c2, d1, d2
10	ECG and Electrolyte Imbalances	Effects of electrolyte disturbances on the ECG Understanding conditions such as hyperkalemia and hypokalemia	1	2	a1, a3, b2, c1, c2
11	Hands-On Practice	Practical sessions on ECG lead placement and recording Case studies for real-world application Simulation of various arrhythmias and their identification Legal and Ethical Considerations Documentation and patient consent Ethical	2	4	a1, c1, c2, d1, d2

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		considerations in ECG interpretation and handling patient data Course Review and Examination Comprehensive review of topics covered .1 Practical and theoretical assessments .2 Certification or credentialing opportunities .3			
12	Final exam	Final exam	1	2	a1, a2, b1, b2, b3, c1, c2, d1, d2
Number of Weeks /and Units Per Semester			14	32	

B – Practical Aspect:

Order	Task/ Experiments	Number of Weeks	Contact hours	Learning Outcomes
	Not applicable			
Number of Weeks /and Units Per Semester				

V. Teaching strategies of the course

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- 1-Lecture – Discussion
- 2- Demonstration
- 3- Student assignment
- 4- Role Plays
- 5- Brainstorming
- 6- Case study
- 7- Field work

V. Assessments strategies of the course

Assess role plays with the check-list on communication
Assess communication techniques by rating scale
Assess performance with rating scale

VI. Assignments

No	Assignments	Aligned CILOs (symbols)	Week Due	Mark
1	Performing health assessment and requesting diagnostic measures for three assigned patients	c1, c2, d1, d2	2	2.5
2	Write plan of management for three assigned patients	c1, c2, d1, d2	2	2.5

VII. Schedule of Assessment Tasks for Students During the Semester

Theoretical Part

No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1	Attendance and activities	15th week	5	5%	a1, a2, b1, b2
2	Student assignments	5th and 12th week	5	5%	a1, a2, b3, b1, b2, b3
3	Mid-term exam	7th or 8th week	20	20%	a1, a2, b1, b2, c2,d2
4	Final-exam	16th- 17th week	70	70 %	a1, a2, a3, b1, b2, c2, d2

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Clinical Part					
No	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
	Not applicable				
Number of Weeks /and Units Per Semester					

VIII. Learning Resources:	
Written in the following order: (Author; Year of publication; Title; Edition – Place of publication – Publisher).	
1- Required Textbook(s) (maximum two).	المراجع الرئيسية:
"Clinical ECG Interpretation: A to Z by Case" by Ken Grauer - This book provides case studies to teach clinicians how to interpret ECGs. It's comprehensive and easy to understand. .6 "ECG Made Easy" by John R. Hampton - A user-friendly guide that breaks down ECG concepts into simple terms, ideal for beginners. .7 "The ECG Made Simple" by A. K. Bhargava & A. L. Bhargava - Another approachable resource emphasizing the fundamental aspects of ECG interpretation. .8 "12-Lead ECG in Acute Care" by J. Jeffers and A. D. Davis - Focused on the application of 12-lead ECGs in acute settings, this book is useful for emergency professionals. .9 .10	
2- Essential References.	المراجع المساندة
"Electrocardiography in Clinical Practice" by P. K. Shah and E. A. Packer - A more advanced text that covers the clinical applications and interpretation of ECGs in various scenarios. .6 "Basic Arrhythmias" by Joseph T. Flynn and G. Bertelsen - This book provides insights into recognizing common arrhythmias through ECG readings. .7 "The ECG: A 2-in-1 Workbook" by A. R. W. Hinton and J. L. Hart - A workbook designed for practical learning that accompanies theoretical ECG study. .8 Online Resources and Courses - Websites like Medscape, ECG Wave-Maker, and the American Heart Association offer valuable online materials for ECG education. .9 Video Tutorials - Platforms like YouTube feature instructional videos on ECG interpretation from various healthcare professionals. .10	

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3- Electronic Materials and Web Sites etc. المصادر الإلكترونية ومواقع الإنترنت...الخ	
	1. http://www.google.com
IX. Course Policies: الضوابط والسياسات المتبعة في المساق	
1	Class Attendance: At least 75 % of the course hours should be attended by the student. Otherwise, he/she will not be allowed to attend the final exam
2	Tardy: any student who is late for more than 15 minutes from starting the lecture will not be allowed to attend the lecture and will be considered absent.
3	Exam Attendance/Punctuality: Any student who is late for more than 30 minutes from starting the exam will not be allowed to attend the exam and will be considered absent.
4	Assignments & Projects: Assignments and projects will be assessed individually unless the teacher request for group work
5	Cheating: Cheating by any means will cause the student failure and he/she must re-study the course
6	Plagiarism: Plagiarism by any means will cause the student failure in the course. Other disciplinary procedures will be according to the college rules.
7	Other policies (سياسات أخرى): -

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