جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Antibiotics**		**Module Delivery**
Module Type	Core		☒Theory ☐Lecture ☒Lab ☐Tutorial ☐Practical ☒Seminar
Module Code	UOMU0307063		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	6	**Semester of Delivery**	3
Administering Department	Medical biotechnology	**College**	Sciences of college
Module Leader	**Hasanain Khaleel Ibrahim**	**e-mail**	Hasanain.Khaleel.Ibrahim@uomus.edu.iq
Module Leader's Acad. Title	Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date		**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	MTB-35019 , MTB-23012	**Semester**	3, 4
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To explore the history and discovery of antibiotics, including key milestones and notable scientists in the field. 2. To understand the principles of antimicrobial resistance and its impact on the effectiveness of antibiotics. 3. To study the different classes of antibiotics, their modes of action, and their specific target bacteria. 4. To examine the mechanisms of bacterial resistance to antibiotics and strategies to combat resistance. 5. To gain knowledge about the pharmacokinetics and pharmacodynamics of antibiotics, including absorption, distribution, metabolism, and elimination. 6. To learn about appropriate use of antibiotics, including factors influencing antibiotic selection, dosage regimens, and considerations for special populations. 7. To explore the adverse effects and potential complications associated with antibiotic use. 8. To understand the role of antibiotics in prophylaxis, empirical therapy, and targeted treatment of specific infections. 9. To analyze case studies and real-life scenarios to apply the knowledge of antibiotics in clinical practice. 10. To foster critical thinking and research skills related to antibiotics, including evaluating scientific literature, interpreting clinical data, and discussing emerging trends in antibiotic research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge: Students will gain a solid understanding of antibiotics, including their classification, mechanisms of action, and spectrum of activity against different types of bacteria. They will also learn about the pharmacokinetics and pharmacodynamics of antibiotics.

	2. Understanding of Resistance: Students will develop an understanding of antimicrobial resistance, including the causes, mechanisms, and implications for public health. They will learn about the strategies used by bacteria to develop resistance and explore ways to combat it. 3. Clinical Application: Students will learn how antibiotics are used in clinical practice, including appropriate selection, dosage considerations, and treatment strategies for different types of bacterial infections. They will understand the principles of empirical therapy and targeted treatment based on bacterial susceptibility. 4. Critical Thinking: Students will develop critical thinking skills to evaluate scientific literature related to antibiotics. They will learn how to interpret clinical data, analyze case studies, and make informed decisions about antibiotic use in various clinical scenarios. 5. Patient Safety: Students will gain knowledge about the adverse effects, potential complications, and interactions associated with antibiotics. They will understand the importance of patient safety and the responsible use of antibiotics to minimize the risk of adverse outcomes. 6. Research Skills: Students may develop research skills related to antibiotics, including the ability to review and analyze scientific studies, conduct literature reviews, and explore emerging trends in antibiotic research. This may lay the foundation for further studies or contribute to ongoing research in the field.
Indicative Contents المحتويات الإرشادية	In lecture lab #1-#5 they will need (15hr). In lecture lab #7- #13 they will need (60 hr). In lecture lab #15 they will need (10hr).

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategies for teaching an antibiotic course: 1. Lecture-based Teaching: Traditional lectures can be used to provide foundational

	knowledge on antibiotics, covering topics such as classification, mechanisms of action, and clinical applications. Instructors can incorporate visuals, case studies, and real-life examples to illustrate concepts and engage students. 2. Active Learning: Encourage active learning by incorporating interactive activities into the course. This can include group discussions, debates, case-based learning, problem-solving exercises, and hands-on laboratory work. These activities help students apply their knowledge, think critically, and reinforce their understanding of antibiotic concepts. 3. Clinical Scenarios: Incorporate clinical scenarios into the course to bridge the gap between theory and practice. Presenting realistic patient cases allows students to analyze and apply their knowledge of antibiotics in a clinical context. This helps develop clinical reasoning skills and decision-making abilities. 4. Case Studies and Problem-Based Learning: Utilize case studies and problem-based learning approaches to foster critical thinking and problem-solving skills. Students can work individually or in groups to analyze complex cases, identify appropriate antibiotics, and discuss treatment strategies while considering patient-specific factors. 5. Multidisciplinary Approach: Highlight the multidisciplinary nature of antibiotics by integrating perspectives from different fields, such as microbiology, pharmacology, immunology, and infectious diseases. This approach helps students understand the broader context and implications of antibiotic use. 6. Guest Speakers and Experts: Invite guest speakers, such as infectious disease specialists, pharmacists, or researchers, to share their experiences and expertise. This provides students with valuable insights into real-world applications of antibiotics and exposes them to diverse perspectives. 7. Use of Technology: Incorporate technology tools and resources to enhance learning. This can include virtual simulations, interactive online modules, virtual labs, and online databases for exploring antibiotic information and research. 8. Assessment Strategies: Implement various assessment methods, including quizzes, exams, case presentations, research projects, and oral presentations. This ensures that students are actively engaged in the learning process and allows instructors to evaluate their understanding and application of antibiotic concepts. 9. Stay Updated: Keep the course content up to date by incorporating the latest research, guidelines, and emerging trends in antibiotic use and resistance. This ensures that students are equipped with current knowledge and prepares them for the evolving field of antibiotics. 10. Ethical Considerations: Discuss the ethical considerations surrounding antibiotic use, including topics such as antibiotic stewardship, responsible prescribing, and the impact of antibiotic resistance on global health. Encourage discussions on the social, economic, and environmental implications of antibiotic use and promote responsible

	practices.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10%	4, 6, 13	#1 and#2, #3-#5, #9
	Assignments	2	10%	8 and 15	#1 and #12
	Projects / Lab.	1	10%	continuous	all
	Report	2	10%	9	#14
Summative assessment	**Midterm Exam**	2h	10%	7	#1-#6, #8-#14
	Final Exam	3h	50	16	all
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, definition, characteristics of ideal antibiotics, history of antibiotics, terminologies, applications
Week 2	Classification of antibiotics: according to spectrum, effectiveness, mode of action and chemical structure.
Week 3	Classification based on chemical structure (the code system of Berdy): families and subfamilies of antibiotics
Week 4	Classification based on chemical structure: families and subfamilies of antibiotics
Week 5	Classification based on mechanism action: cell wall inhibitors, protein synthesis inhibitors, nucleic acid inhibitors, cytoplasmic membrane inhibitors and Folate metabolism inhibitors
Week 6	Penetration of antibiotics into the cell. Factors that influence transmembrane movement of antibiotics.Modes of resistance to antibiotics
Week 7	Production of antibiotics from microorganism: the concept of idiophase and trophase. Primary and secondary metabolism in relation to antibiotics production
Week 8	Ecological role of antibiotics in nature. Antibiotics in regulation of metabolism
Week 9	Role of antibiotics in differentiation of producing microorganisms.
Week 10	Isolation of antibiotics. Isolation of the microorganisms. Classical tests & modern methods in primary screening techniques. Secondary screening techniques.
Week 11	Extraction and purification of antibiotics. Fractionation of antibiotics. Chromatography & electrophoresis. Characterization techniques, Hamill's scheme & Bostian computer system.
Week 12	Quantitative determination of antibiotics: Diffusion methods, turbidimetric methods, respirometric method & antibiotic sensitivity tests.
Week 13	Choice & administration of antibiotics to humans. Absorption, Distribution, Localization in tissues, Biotransformation and Excretion.
Week 14	Usage of antibiotics, in medicine, veterinary and animal feed; in agriculture and the food industry.
Week 15	Non-antibiotics chemotherapeutic agents
Week 16	Final exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Instruments and tools used in the antibiotics laboratory. Media used in antibiotics isolation and sensitivity tets
Week 2	Classification of antibiotics according to mode of action and chemical structure. Mechanism of antibiotics resistance
Week 3	Microorganism producing antibiotics: definition, characteristics, types of antibiotics which produce from them
Week 4	Microorganism producing antibiotics: definition, characteristics, types of antibiotics which produce from them
Week 5	Method of screening of antibiotics from soil: primary isolation, colony selection and inoculation and evidence of antibiosis and conformation
Week 6	Method of screening of antibiotics from soil: primary isolation, colony selection and inoculation and evidence of antibiosis and conformation
Week 7	Isolation and Identification of Microorganisms producing antibiotics
Week 8	Isolation and Identification of Microorganisms producing antibiotics
Week 9	Method of extraction and purification of antibiotics part I
Week 10	Method of extraction and purification of antibiotics part II
Week 11	Method of extraction and purification of antibiotics part III
Week 12	Antibiotic sensitivity test using disk diffusion method
Week 13	Antibiotic sensitivity test using agar diffusion method
Week 14	β-lactamase and extended beta lactamase tests
Week 15	Determination of MIC and MBC of antibiotics

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1. "Antibiotics: Challenges, Mechanisms, Opportunities" by Christopher Walsh and Timothy Wencewicz - This book provides a comprehensive overview of antibiotics, covering their discovery, mechanisms of action, resistance, and current challenges in the field. 2. "The Sanford Guide to Antimicrobial Therapy" - This popular reference guide is widely used by healthcare professionals and provides up-to-date information on the	

	appropriate use of antibiotics for various infectious diseases. It includes dosage recommendations, susceptibility data, and treatment guidelines. 3. "Antibiotic Basics for Clinicians: The ABCs of Choosing the Right Antibacterial Agent" by Alan R. Hauser - This practical guide is designed for healthcare professionals and offers concise information on antibiotic selection, dosing, and clinical use. It also provides guidance on managing common infectious diseases. 4. "Principles and Practice of Pediatric Infectious Diseases" edited by Sarah S. Long et al. - This comprehensive textbook focuses on pediatric infectious diseases, including the use of antibiotics in children. It covers diagnostic approaches, treatment guidelines, and prevention strategies.	
Recommended Texts	"The Sanford Guide to Antimicrobial Therapy"	
Websites	- Official Website: https://www.sanfordsuide.com/	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.