

# MODULE DESCRIPTION FORM

## نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Communication Fundamentals		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET2105		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	CET
Module Leader	Omar Abdulrahman Mashi	e-mail	omarxpsycho@yahoo.com
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	MSc.
Module Tutor	Omar Abdulrahman Mashi	e-mail	omarxpsycho@yahoo.com
Peer Reviewer Name	Dr. Zahraa Mohammed Salah	e-mail	zahraamohammed85@gmail.com
Scientific Committee Approval Date	16/09/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

## Module Aims, Learning Outcomes and Indicative Contents

### أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p><b>Module Aims</b> أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Understanding the communication systems and signals.</li> <li>2. Viewing and knowledge block diagram communication system</li> <li>3. Analyzing the advantage and disadvantage of each type of signals and systems.</li> <li>4. Analyzing signals in Fourier series and Fourier transform.</li> <li>5. To develop problem solving skills and understanding of filters types and design</li> </ol>
<p><b>Module Learning Outcomes</b> مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> <li>1. Recognize Basic Principles of Communication.</li> <li>2. Explain the Block Diagram of a Communication System.</li> <li>3 Identify essential parts that must be present in communication systems.</li> <li>4. List the different types of media used in a communication system.</li> <li>5. Describe the measured effect of noise on a communication system.</li> <li>6. Define modulation over some carriers to make it suitable for transmission over a long distance.</li> <li>7. Discuss Principles of Signals in Communication and shows examples of signals of various types.</li> <li>8. Identify the difference between Analog and Digital Signals.</li> <li>9. List the various types of continuous-time signals</li> <li>10. Discuss the classification of signals based on their characteristics and nature of availability.</li> <li>11. Define the advantages and disadvantages of each type of signal in communications.</li> <li>12. Explain the two the Fourier Series in the Continuous Domain is associated with the important classes of Fourier series methods and Trigonometric Fourier series.</li> <li>13. Summarize by various magnitudes or coefficients of Exponential Fourier Series on Determination for different harmonic signals.</li> <li>14. Definition A major disadvantage of the Fourier series is on account of its periodicity, by means of the limitation of the Fourier series</li> <li>15. Identify Fourier transform representation for the non-periodic signals</li> <li>16. Describe the Inverse Fourier transform as a mathematical transformation technique that transforms signals from the continuous-frequency domain to the corresponding time domain and vice-versa</li> <li>17. Definition Filters, four basic types of filters: Passive or Active depending on the Construction of filters.</li> <li>18. Describe the filter depending on the design of filters: Low Pass Filter (LPF), High Pass Filter (HPF), Band Pass Filter (BPF) and</li> </ol>

	<p>Band Stop Filter (BSF).</p> <p>19. Summarize the design formula for a passive filter LPF and HPF consisting of coils, capacitors, and resistors.</p> <p>20. Identify the design formula for a passive filter Constant-K: LPF , HPF, and BPF consisting of coils, capacitors, and resistors .</p> <p>21. Definition active filters, listing the advantage of active filter over disadvantage of passive filter.</p> <p>22. Identify the design formula for active filter first order LPF, HPF and BPF used op-Amp as main component.</p>
<p><b>Indicative Contents</b> المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><b>Part A</b> -Communication System : Basic Principles of Communication System, types of media used in a communication system, effect of noise on a communication system and modulation in analogue communication (10 hr )</p> <p><b>Part B</b> Signals in Communication: Principles of Signals, examples of signals of various types, difference between Analog and Digital Signals, various types of continuous-time signals, classification of signals based on their characteristics and nature of availability and the advantages and disadvantages of each type of signal in communications.(15 hr)</p> <p><b>Part C- I</b>- Fourier Series in the Continuous Domain: the important classes of Fourier series methods and Trigonometric Fourier series, Exponential Fourier ( 5 hr)</p> <p><b>Part C- II</b>: Fourier transform representation: disadvantage of the Fourier series, Fourier transform for non-periodic signals, Inverse Fourier transform as a mathematical transformation technique.(10 hr)</p> <p><b>Part D</b>- Filters: basic types of filters: Passive and Active , design of filters: Low Pass Filter (LPF), High Pass Filter (HPF), Band Pass Filter (BPF) and Band Stop Filter (BSF),design formula for each type of filters for passive and active.(34 hr)</p>
<p><b>Learning and Teaching Strategies</b> استراتيجيات التعلم والتعليم</p>	
<p><b>Strategies</b></p>	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

<b>Student Workload (SWL)</b> الحمل الدراسي للطالب موزع على (15) اسبوع			
<b>Structured SWL (h/sem)</b> الحمل الدراسي المنتظم للطالب خلال الفصل	64	<b>Structured SWL (h/w)</b> الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
<b>Unstructured SWL (h/sem)</b> الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	<b>Unstructured SWL (h/w)</b> الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
<b>Total SWL (h/sem)</b> الحمل الدراسي الكلي للطالب خلال الفصل	125		

<b>Module Evaluation</b> تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
<b>Formative assessment</b>	<b>Quizzes</b>	2	10% (10)	5, 10	LO #1- 4, LO #5- 15
	<b>Assignments</b>	2	10% (10)	2, 12	LO # 1-7, , LO #8- 18
	<b>Projects / Lab.</b>	1	10% (10)	Continuous	
	<b>Report</b>	1	10% (10)	13	LO # 1-17
<b>Summative assessment</b>	<b>Midterm Exam</b>	2 hr	10% (10)	7	LO # 1-16
	<b>Final Exam</b>	4hr	50% (50)	16	All
<b>Total assessment</b>			100% (100 Marks)		

<b>Delivery Plan (Weekly Syllabus)</b>	
المنهاج الاسبوعي النظري	
	<b>Material Covered</b>
<b>Week 1</b>	Basic Principles of Communication: Introduction to Communication, The Block Diagram of a Communication System
<b>Week 2</b>	Signals: Principles of Signals & Definition, Difference between Analog and Digital Signals
<b>Week 3</b>	Types of continuous-time signals: (Unit–Step Function, Unit –Ramp Function, Impulse Function, Unit –Parabola Function, Signum Function, Rectangular Function, Triangular Function, Real Exponential Signal, Sinusoidal Function & Sampling Function)
<b>Week 4</b>	Classification of Signals , Continuous –Time Signal, Discrete- Time Signals ,Even Signals, Odd Signals , Deterministic Signals, Random Signals, Sinusoidal Signals, Complex Exponential Signals
<b>Week 5</b>	Solved Problems: Periodic Signals, Aperiodic Signals ,Solved Problems: Energy Signals ,Power Signals
<b>Week 6</b>	Fourier series: The Fourier Series in Continuous Domain, Trigonometric Fourier series and Solved Examples , Exponential Fourier series and Solved Examples . Fourier Transform : Fourier Transform Examples
<b>Week 7</b>	<b>Midterm Exam</b>
<b>Week 8</b>	Inverse Fourier Transform Example: The Inverse Fourier Transform
<b>Week 9</b>	Filters : Types of filters : Classification Based on Construction and Design RC-LPF, RC-HPF BPF (Low Pass Filter Stage and High Pass Filter Stage) (Type 1& Type 2) Band Stop Filter
<b>Week 10</b>	Passive Filters : Formula and Procedure of Design RL-LPF, RL-HPF
<b>Week 11</b>	LC- LPF, Constant-K-(T& $\pi$ Section) LC- HPF, Constant-K-(T& $\pi$ Section) LC- BPF, Constant-K-(T& $\pi$ Section)
<b>Week 12</b>	Band Pass Filter Stage) (Type 1& Type 2)
<b>Week 13</b>	Active Filters Comparison Between Passive & Active Filters
<b>Week 14</b>	First- Order LPF First- Order HPF
<b>Week 15</b>	BPF Active Filter & Band reject or Notch Filter
<b>Week 16</b>	Preparatory week before the final Exam

<b>Delivery Plan (Weekly Lab. Syllabus)</b> المنهاج الاسبوعي للمختبر	
	Material Covered
<b>Week 1</b>	Lab 1: Introduction to Lab Instruments
<b>Week 2</b>	Lab 2: Function Generator and Oscilloscope.
<b>Week 3</b>	Lab 3: Introduction to filters types construction
<b>Week 4</b>	Lab 4: Fourier series and Fourier Transform examples using the Math Function
<b>Week 5</b>	Lab 5: Introduction to filters types design
<b>Week 6</b>	Lab 6: Introduction to Passive filters
<b>Week 7</b>	Lab 7: Introduction to active filters
<b>Week 8</b>	Lab 8: Constant-K-(T& $\pi$ Section) construction
<b>Week 9</b>	Lab 9: Constant-K-(T& $\pi$ Section) design
<b>Week 10</b>	Lab 10: Constant-K-(T& $\pi$ Section) LC- LPF
<b>Week 11</b>	Lab 11: Constant-K-(T& $\pi$ Section) LC-HPF
<b>Week 12</b>	Lab 12: Constant-K-(T& $\pi$ Section)- BPF
<b>Week 13</b>	Lab 13: Constant-K-(T& $\pi$ Section)- BPF – Type-1
<b>Week 14</b>	Lab 14: Constant-K-(T& $\pi$ Section)-BPF –Type-2

<b>Learning and Teaching Resources</b> مصادر التعلم والتدريس		
	Text	Available in the Library?
<b>Required Texts</b>	Principles of Communication Systems By J.S.Chitode, First Edition-2007 Modern Digital and Analog Communication Systems ,By B.P.Lathi OXFORD	Yes
<b>Recommended Texts</b>	Analog and Digital Communications, By Schaum Second Edition Data Communications and Networking, By Behrouz A. Forouzan, Fifth Edition	No
<b>Websites</b>		

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