

مختصر توصيف المقرر

(Course Information)

معلومات المقرر *

اسم المقرر:	أشباه الموصلات
رقم المقرر:	فيز 4732
اسم ورقم المتطلب السابق:	فيز 3712
اسم ورقم المتطلب المرافق:	--
مستوى المقرر:	السابع
الساعات المعتمدة:	3 (0+0+3)
Module Title:	Semiconductors
Module ID:	PHYS 4732
Prerequisite :	PHYS 3712
Co-requisite :	--
Course Level:	Seventh
Credit Hours:	3 (3+0+0)

Module Description

وصف المقرر :

<p><u>Semiconductor Fundamentals:</u> Carrier distribution functions, Carrier densities, Carrier Transport, Carrier recombination and generation, Continuity equation, The drift-diffusion model.</p> <p><u>P-N Junctions:</u> Electrostatic analysis of a P-N diode, The P-N diode current, Reverse bias breakdown.</p> <p><u>Bipolar Junction Transistors:</u> Structure and principle of operation, Ideal transistor model, Non-ideal effects, Base and collector transit time effects, BJT circuit models, BJT Technology.</p> <p><u>MOS Capacitors:</u> Structure and principle of operation, MOS analysis.</p> <p><u>MOS Field-Effect-Transistors:</u> Structure and principle of operation, MOSFET models, Threshold voltage, MOSFET Circuits and Technology.</p>
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Module Aims

أهداف المقرر :

<p>Aim of this course is to provide a base to students for his future research and study planning. After successful completion of this course student will be able to understand</p> <p>Fundamentals of Semiconductors, Physics and working principle of P-N Junctions, Bipolar Junction Transistors, MOS Capacitors and MOS Field-Effect-Transistors.</p>

Learning Outcomes:

مخرجات التعليم:

<p>Outcome of this course will be the transfer of knowledge of Physics of semiconductors its working principle and applications in real word.</p> <p>Fundamentals of Semiconductors, Physics and working principle of P-N Junctions, Bipolar Junction Transistors, MOS Capacitors and MOS Field-Effect-Transistors.</p>

Course Contents:

محتوى المقرر:

ساعات التدريس (Hours)	عدد الأسابيع (Weeks)	قائمة الموضوعات (Subjects)
6	2	Semiconductor Fundamentals:
6	2	Carrier distribution functions, Carrier densities, Carrier Transport,
6	2	Carrier recombination and generation, Continuity equation, The drift-diffusion model.
6	2	P-N Junctions: Electrostatic analysis of a P-N diode, The P-N diode current, Reverse bias breakdown.
9	3	Bipolar Junction Transistors: Structure and principle of operation, Ideal transistor model, Non-ideal effects, Base and collector transit time effects, BJT circuit models, BJT Technology.
3	1	MOS Capacitors: Structure and principle of operation, MOS analysis.
6	2	MOS Field-Effect-Transistors: Structure and principle of operation, MOSFET models, Threshold voltage, MOSFET Circuits and Technology.

Textbook and References:

المقرر والمراجع المساندة:

سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم الكتاب المقرر Textbook title
(1998) ISBN: 012752116X	Academic Press	Robert Willardson and A. C. Beer	Semiconductors and semimetals
سنة النشر Publishing Year	اسم الناشر Publisher	اسم المؤلف (رئيسي) Author's Name	اسم المرجع Reference
(2011); 4 th edition ISBN-10: 0071317082	McGraw-Hill Higher Education	Donald A Neamen	Semiconductor Physics and Devices
(2006) ISBN-10: 8126517026	Wiley student edition	Simon M. Sze, Kwok K. Ng	Physics of Semiconductor Devices