باسمه تعالی

طرح درس جهت ارائه در نیمسال تحصیل ۴۰۲۱

دانشکده	**مهندسی برق و کامپیوتر**	**گروه**	**الکترونیک**
گرایش	**افزاره**	**مقطع**	**کارشناسی ارشد**
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✓ **اهداف درس:**

Goals:

Understanding the major semiconductor optoelectronic devices, their physics and operating principles, design, characteristics and applications.

Contents:

Review of optoelectronics, position, role, trend, and light wave communication
Optoelectronic materials and heterostructure semiconductor devices
Optical processes and light propagation in crystals (polarization, refraction, reflection, transmission, Maxwell's equations and wave equations)
Light propagation in waveguides (fibers, planar waveguides, couplers)
Optical and electronic properties of semiconductors
Light emitting diodes (material systems, physics of operation, structures, characteristics and reliability)
Laser diodes (spontaneous and stimulated emission, gain and loss, material systems, physics of operation, structures, structures, time response, characteristics)
Optical detectors (optical absorption, physics of operation, structures, characteristics)
Optical communication systems

✓ **رئوس مطالب و برنامه ارائه در کلاس:** (در صورتی که واحد عملی یا نظری-عملی بود، نوع آموزش در توضیحات بیان شود)

شماره جلسه	موضوع جلسه درس	توضیحات
جلسه ۱	Review of optoelectronics, position, role, trend, and light wave communication	
جلسه ۲	Review of optoelectronics, position, role, trend, and light wave communication	
جلسه ۳	Optoelectronic materials and heterostructure semiconductor devices	
جلسه ۴	Optoelectronic materials and heterostructure semiconductor devices	
جلسه ۵	Optical processes (polarization, refraction, reflection, transmission, Maxwell's equations and wave equations)	
جلسه ۶	Optical processes (polarization, refraction, reflection, transmission, Maxwell's equations and wave equations)	
جلسه ۷	Optical processes (polarization, refraction, reflection, transmission, Maxwell's equations and wave equations)	

جلسه ۸	Light propagation in waveguides (fibers, planar waveguides, couplers)	
جلسه ۹	Light propagation in waveguides (fibers, planar waveguides, couplers)	
جلسه ۱۰	Light propagation in waveguides (fibers, planar waveguides, couplers)	
جلسه ۱۱	Optical and electronic properties of semiconductors	
جلسه ۱۲	Optical and electronic properties of semiconductors	
جلسه ۱۳	Light emitting diodes (material systems, physics of operation, structures, characteristics and reliability)	
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جلسه ۱۷	Laser diodes (spontaneous and stimulated emission, gain and loss, material systems, physics of operation, structures, structures, time response, characteristics)	
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جلسه ۲۴	Optical detectors (optical absorption, physics of operation, structures, characteristics)	
جلسه ۲۵	Optical detectors (optical absorption, physics of operation, structures, characteristics)	
جلسه ۲۶	Optical communication systems	

- ✓ روش ارزشیابی:
- -پروژه درسی ۲۰٪
- -پایان ترم ۵۵٪
- -ارائه سمینار درسی ۱۰٪
- - تمرین ها ۵٪

- کوئیز ۱۰٪

✓ منابع :

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3. G. P. Agrawal, *Fiber Optic Communication Systems*, John Wiley & Sons, 2002.
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