

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3		Sheet No. 1/5	
Branch	Opto-Electronics Engineering			Semester		VI	
Course Code		Course Name	Laser, Application and Safety				
Course Outcome 1		Explain the function of coherent light source			Teach Hrs	Marks	
Learning Outcome 1		Introduce Coherent Light Source (Cognitive)			8	10	
Contents		<ul style="list-style-type: none"> - Meaning of LASER - Review of Optical spectrum, energy, power, intensity of light - Energy levels - Population inversion 					
Method of Assessment		Internal- Assignment &/ Progressive					
Learning Outcome 2		Explain working of Laser (Cognitive)			10	10	
Contents		<ul style="list-style-type: none"> - Basic components of Laser: Active medium, Pump and Resonator - Basic Principle of Laser - Radiative processes: Absorption, Spontaneous and stimulated emission - Pumping methods: Optical and Electrical discharge pumping 					
Method of Assessment		External-End Semester Exam					
Learning Outcome 3		Describe properties of Laser Radiation (Cognitive)			9	10	
Contents		Meaning and specific use of the followings: <ul style="list-style-type: none"> - Divergence - Coherence - Monochromaticity and spectral width - Intensity - Focusing of Laser beam 					
Method of Assessment		External-End Semester Exam					
Learning Outcome 4		Know general specifications of Laser(Cognitive)			9	10	
Contents		<ul style="list-style-type: none"> - Distinguish between CW and pulsed LASER - List general Optical specifications of Laser System - List general Electrical specifications of Laser System - Need of Cooling system 					
Method of Assessment		External-End Semester Exam					

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT- 3		Sheet No. 2/5	
Branch	Opto-Electronics Engineering			Semester		VI	
Course Code		Course Name	Laser, Application and Safety				
Course Outcome 2		Demonstrate different Laser systems			Teach Hrs.	Marks	
Learning Outcome 5		Demonstrate Popular Gas Lasers (Psychomotor)			09	15	
Contents		Classification of Laser based on active medium: <ul style="list-style-type: none"> - Solid state Laser, Gas Laser, Liquid Laser, Semiconductor Laser Operation, performance characteristics and specific application of: <ul style="list-style-type: none"> - He-Ne Laser - CO₂ Laser Compare CO ₂ Laser and He-Ne Laser Beam divergence measurement of HeNe/Semiconductor Laser					
Method of Assessment		External- Practical					
Learning Outcome 6		Demonstrate Popular high power Lasers (Psychomotor)			7	10	
Contents		Operation, performance characteristics and specific application of: <ul style="list-style-type: none"> - Nd: YAG Laser - Fiber Laser Compare Nd:YAG Laser and Fiber Laser					
Method of Assessment		Internal- Practical					
Learning Outcome 7		Describe the working of Semiconductor Laser (Cognitive)			9	10	
Contents		Semiconductor (Diode) Laser: <ul style="list-style-type: none"> - Materials, Band gap and Wavelength - Structure - Basic Principle and Pumping Method - Advantages of Semiconductor Laser - List Various Applications of Semiconductor Laser 					
Method of Assessment		External- End Semester Exam					

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Branch	Opto-Electronics Engineering			Semester		VI	
Course Code		Course Name	Laser, Application and Safety				
Course Outcome 3		Use of high power Laser for various Industrial applications			Teach Hrs.	Marks	
Learning Outcome 8		Describe Material Processing Applications (Cognitive)			9	10	
Contents		<ul style="list-style-type: none"> - Advantages, compare with Conventional methods - Lasers choice and comparison for Material processing - Beam transport mechanism (Typical Setup) - List Various Material Processing Applications 					
Method of Assessment		External- End Semester Exam					
Learning Outcome 9		Explain Laser Cutting of Metals and Non-Metals (Cognitive)			9	10	
Contents		Laser Cutting methods: <ul style="list-style-type: none"> - Melt and Blow Method - Vaporization cutting - Scribing 					
Method of Assessment		External- End Semester Exam					
Learning Outcome 10		Describe other Industrial Applications (Cognitive)			8	10	
Contents		<ul style="list-style-type: none"> - Laser Welding - Laser engraving - Laser Surface hardening 					
Method of Assessment		Internal- Assignment &/ Progressive					

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT- 3		Sheet No. 4/5		
Branch		Opto-Electronics Engineering			Semester		VI	
Course Code		Course Name		Laser, Application and Safety				
Course Outcome 4		Use of Lasers for various services of human being			Teach Hrs.		Marks	
Learning Outcome 11		Use Laser fro metrological applications (Psychomotor)			9		15	
Contents		Metrology Applications: <ul style="list-style-type: none"> - Optical alignment - Distance measurement - Diameter measurement - Holography 						
Method of Assessment		External-Practical						
Learning Outcome 12		Know various medical applications of Laser (Cognitive)			8		10	
Contents		Medical Applications: <ul style="list-style-type: none"> - Eye treatment - Laser surgery - Cancer treatment - Dermatology 						
Method of Assessment		Internal- Assignment &/ Progressive						

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Branch		Opto-Electronics Engineering			Semester		VI	
Course Code		Course Name		Laser, Application and Safety				
Course Outcome 5		Apply safety precautions for the safe use of Lasers			Teach Hrs.		Marks	
Learning Outcome 13		Describe the need of safe practices (Cognitive)			9		10	
Contents		<ul style="list-style-type: none"> - Hazards of Laser system - Radiation Hazards - Electrical Hazards - Chemical and Fire Hazards - Effect of Radiation on eyes and skin - Safety levels/Classes 						
Method of Assessment		External- End Semester Exam						
Learning Outcome 14		Apply safe Practices during high power laser applications (Psychomotor)			7		10	
Contents		<ul style="list-style-type: none"> - Protection methods - Safety equipment - Safety precaution - Safety environment. 						
Method of Assessment		Internal- Practical						

Suggested List of Experiments:

S.N.	Experiment	CO
1.	Measurement of different parameters of lasers such as CW power, pulse duration, pulse energy, pulse peak power etc.	02
2.	Measurement of diameter	04
3.	Measurement of power of CO ₂ Laser	02
4.	Demonstration of CO ₂ Laser	02
5.	Demonstration of He-Ne Laser	02
6.	Measurement of Beam divergence	02
7.	Study of material processing such as welding, drilling, cutting, marking, surface hardening etc.	03
8.	Study of laser safety equipment	05
9.	Construction and Reconstruction of a Hologram	04
10.	Visit to RRCAT Indore	

Reference Books/Web Portals:

S.N.	Title	Author/Publisher
1	Lasers: principle and application	Wilson- Hawkes
2	LASERS	Ghatak – Thyagrajan
3	Optoelectronics: An Introduction	Wilson- Hawkes
4	Laser, Principle, Types & Application	K.R. Nambier