## Tamkang University Academic Year 113, 2nd Semester Course Syllabus

Course Title	INTRODUCTION TO SEMICONDUCTOR LASERS FOR OPTICAL COMMUNICATIONS	Instructor	CHUNG, LUNGWEI			
Course Class	TETIM1A MASTER'S PROGRAM, DIVISION OF ARTIFICIAL INTELLIGENCE AND INTERNET OF THINGS, DEPARTMENT OF ELECTRICAL AND COMPUTER	Details	<ul> <li>General Course</li> <li>Selective</li> <li>One Semester</li> <li>3 Credits</li> </ul>			
Relevance to SDGs	ENGINEERING, 1A SDG7 Affordable and clean energy vance SDG8 Decent work and economic growth SGS SDG9 Industry, Innovation, and Infrastructure					
Departmental Aim of Education						
<ul> <li>I. Educate students to have electrical and robotic engineering knowledge to solve electrical engineering related problems.</li> <li>II. Educate the student as a senior electrical and robotic engineer to enable creative thinking, to be independently complete the assigned tasks and be willing to work as a team member.</li> <li>II. Educate students to have advanced global awareness to cope with the challenges of modern diversified professor careers.</li> </ul>						
	Subject Departmental core competences					
<ul> <li>A. Core competency 1.1: Have professional knowledge in the disciplines of electrical, computer and robotic engineerings.(ratio:20.00)</li> <li>B. Core competency 1.2: Have the ability to plan and execute electrical and robotic engineering research studies.(ratio:25.00)</li> <li>C. Core competency 2.1: Have the ability to prepare professional papers in the electrical and robotic engineering field.(ratio:20.00)</li> <li>D. Core competency 2.2: Have the abilities to be creative thinking and to independently solve electrical and robotic engineering related problems.(ratio:15.00)</li> <li>E. Core competency 2.3: Have the ability to lead, manage, plan, coordinate and integrate personnel from various fields.(ratio:10.00)</li> <li>F. Core competency 3.1: Have advanced global awareness and the ability of lifelong self-study.(ratio:10.00)</li> </ul>						
Subject Schoolwide essential virtues						
<ol> <li>A global perspective. (ratio:10.00)</li> <li>Information literacy. (ratio:30.00)</li> <li>A vision for the future. (ratio:20.00)</li> </ol>						

4. Moral integrity. (ratio:10.00)

5. Independent thinking. (ratio:15.00)

6. A cheerful attitude and healthy lifestyle. (ratio:5.00)

7. A spirit of teamwork and dedication. (ratio:5.00)

8. A sense of aesthetic appreciation. (ratio:5.00)

In	Course	With the large requirements of development of IoT, AI and cloud storage, the high speed demand for large data centers such as GOOGLE and MICROSOFT is becoming more and more important. The transmission of data requires with fast and large quantities, and the optical interconnect technology with high broadband of silicon photonics becomes the most important foundation. This course introduces related important technologies such as semiconductor components and processes, laser principles, communication principles, signal processing and electromagnetic simulation, etc.					
The correspondences between the course's instructional objectives and the cognitive, affective, and psychomotor objectives. Differentiate the various objective methods among the cognitive, affective and psychomotor							
dor	mains of the c	ourse's ii	nstructional objectives.				
I. (	Cognitive : Em	nphasis u	pon the study of various	s kinds of knowledge in the cognition of			
TT A	the for the form	course's	veracity, conception, pro	ocedures, outcomes, etc.	1		
II.A	mective : Emp mor	nasis up als, attiti	on the study of various k ude, conviction, values, e	kinds of knowledge in the course's appea .tc.	Ι,		
III.F	sychomotor:	Emphas	is upon the study of the	course's physical activity and technical			
	mar	nipulation	ז.				
No.	Teaching Objectives objective methods						
1	To make the	students	realize the principle and	l application of high	Cognitive		
	speed comm	unicated	components and devied	ces,and further to			
	improve their	r study al	pilities and research leve	ls.			
	The c	correspond	ences of teaching objectives :	core competences, essential virtues, teaching me	thods, and assessment		
No.	Core Compet	ences	Essential Virtues	Teaching Methods	Assessment		
1	ABCDEF		12345678	Lecture	Report(including oral and written)		
				Course Schedule			
Week	2k Date Course Contents		se Contents	Note			
1	114/02/17 ~ 114/02/23     Semester Outline and Course Introduction						

2	114/02/24 ~ 114/03/02	Introduction to the data center and its ultra-high-speed transceiver modules	
3	114/03/03 ~ 114/03/09	Laser Communication Systems I: Amplitude Modulated Systems	
4	114/03/10~ 114/03/16	Coherent Communication Systems .	
5	114/03/17 ~ 114/03/23	The Basics of Lasers	
6	114/03/24 ~ 114/03/30	Semiconductors as Laser Materials 1: Fundamentals	
7	114/03/31~ 114/04/06	Semiconductors as Laser Materials 2: Density of States, Quantum Wells, and Gain	
8	114/04/07 ~ 114/04/13	Semiconductor Laser Operation	
9	114/04/14 ~     Electrical Characteristics of Semiconductor Lasers       114/04/20     Electrical Characteristics of Semiconductor Lasers		
10	114/04/21~ 114/04/27	Midtern Exam	
11	114/04/28 ~ 114/05/04	Optical Cavity	
12	114/05/05~ 114/05/11	Laser Modulation	
13	114/05/12~ 114/05/18	Distributed Feedback Lasers	
14	114/05/19~ 114/05/25	Introduction and application of VECSEL principle	
15	114/05/26~ 114/06/01	Introduction and application of LED principles	
16	114/06/02 ~ 114/06/08	Assorted Miscellany: Dispersion, Fabrication, and Reliability .	
17	114/06/09~ 114/06/15	Final Exam	
18	114/06/16~ 114/06/22	Final Exam Evaluation	
Key capabilities		self-directed learning Information Technology	
Interdisciplinary		STEAM course (S:Science, T:Technology, E:Engineering, M:Math, A field:Integration of Art and Humanist)	
Distinctive teaching		Special/Problem-Based(PBL) Courses	

	Logical Thinking				
Course Content					
Requirement	In class, the main grades are based on the submission of notes or reports.				
Textbooks and Teaching Materials	Self-made teaching materials:Presentations Using teaching materials from other writers:Presentations				
References	Introduction to Semiconductor Lasers for Optical Communications, David J. Klotzkin OPTOELECTRONICS AND PHOTONICS Principles and Practices, S.O. Kasap				
	◆ Attendance: 30.0 % ◆ Mark of Usual:10.0 % ◆ Midterm Exam: 30.0 %				
Grading Policy	<ul> <li>◆ Final Exam: 30.0 %</li> <li>◆ Other ⟨ ⟩: %</li> </ul>				
	This syllabus may be uploaded at the website of Course Syllabus Management System at				
Note	home page of TKU Office of Academic Affairs at <u>http://www.acad.tku.edu.tw/CS/main.php</u> .				
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