

Papua New Guinea University of Technology
Department of Electrical Engineering.....
Lesson Plan

Subject		Subject Code	EE 481
Semester/year	1/2016	Date: Prepared	07nd March, 2016
Lecturer(s)	Mr. Elias Mandawali	Credit Hours (PNG standard)	3 Lecture
Period	15 weeks	Credit Hours (Engineering Accreditation Standard)	3.0
Subject Synopsis	<p>Brief description of the content of the subject</p> <p>This subject as per the University of Technology Handbook deals with kinds of the antenna systems and the propagation of radio waves beginning with the application of radio waves in PNG. The subject shall deal with theories and applications of the number of antenna systems as used in the industry and application, and the subject begins the discussion with the wire radiators, the feed horns and major important polarization methods used in the receiving and in transmission of radio waves. The matching of the transmitting systems to the receiving systems are fundamental including the antenna noise factor introduced in transmission. The propagation of radio waves a looked at with many examples and problems in both the microwave radio and satellite communication systems to and terminate the course with the exams at the end of the period.o the free space. The antenna allows the free space to be used for the transmission of digital and analogue information between two antenna systems place at a line-of-sight that creates electrical path for receiving and transmission of information in both directions simultaneously.</p>		
Contact hours	<p>Lecture: ____3____ hours/week</p> <p>Tutorial: ____1____ hours/week</p> <p>Lab: ____no____ hour/week (average)</p>		
Evaluation	<p>Continuous assessment --40---%</p> <p>Final Examination ____60__ %</p>		
Learning Outcomes	<p>On completion of this subject, students will be able to:</p> <ol style="list-style-type: none"> 1. Understand the fundamental principles of different antennas operation and applications. 2. Define and specify basic antenna parameter in design and application in industry. 3. Analyse the performance of various antennas including the short dipole, derive its radiation fields at near and far fields.. 4. Evaluate the characteristics and performance of four main types applied in the practice and applications of radio waves use. 5. Analyze the propagation of radio waves via antennas and transmitted signal in the presence of attenuator and reflectors. 6. Design of antenna systems from the theory of Friis and the radar equations. 		

Assessment Methods	Distribution	(%)	LO1	LO2	LO3	LO4	LO5
	Laboratory		x	x	x	x	
	Quizzes		x	x	x	x	x
	Tests		x	x	x	x	x
	Projects						x
	Final Examination		x	x	x	x	x
References Used in Class	<p>Latest Reference Material/ Latest edition of reference material. Probably within 7 years.</p> <p>My own lecture notes.</p> <p>Antenna Theory: Analysis and Design, Constantine A. Balanis, 3rd Edition.</p>						
Additional References	Supplementary reference Material if any - Antenna Textbooks and Smart Antennas and Signal Processing, WIT Press, 2001, UK.						

Program Outcomes

PO1	Apply knowledge of mathematical and science in electrical engineering
PO2	Be able to determine important data from the analysis
PO3	Shall be able to to design antenna systems to meet the desired requirement on available economics.
PO4	An ability to apply techniques of using appropriate knowledge and available tools to investigate, design, simulate and build and install commission a complete antenna systems
PO5	Develop knowledge to communicate effectively with others to prepare formal technical documents and plans meeting the detailed reports in electrical engineering systems.
PO6	Leading teams to achieve required aims and goals.
PO7	An ability to identify, analyse, formulate, design, simulate, implement a complete design system meeting the engineering problem.
PO8	Good understanding of professional knowledge and ability to conduct ethical responsibility for the safety of the general public.
PO9	Wider view and understanding of engineering solution a global solutions in economic environment to social impact.
PO10	Develop ability to research into improving ideas and advancing knowledge base and theories for an upgrade of knowledge for the future.
PO11	Good knowledge of contemporary issues due to changing technical environment
PO12	A sound knowledge and ability to lead and manage projects in multidisciplinary environment and apply management techniques, skills, and project management tools important for good engineering practice

Chapter	Sub-Topic	Week	Topic Outcomes (TO)	LO	PO	Delivery Methods
1	Element Antennas:	1-2	Transmitters and receivers in wireless radio communication frequency and antenna design	LO1 LO2	PO1 PO2 PO3	
	Wire Radiators:	3-5	<i>Design of rhombi antenna, horizontal and vertical dipole with reflectors, array radiators, broadside dipoles, yagi uda array, slot arrays, and log periodic array, parabolic reflector.</i>	LO1 LO2 LO3 LO4 LO6	PO1 PO2 PO3 PO4 PO5 PO6	
2	Feeds and Horns:	6-7	rectangular and circular horns, parabolic reflectors, focal length, pattern shapes and aperture illumination, corrugated waveguide and dipole feeds, slot antennas and lenses.		PO1 PO2 PO4	
	Polarization, and Matching	8-10	Polar diagram and bandwidth, directivity and gain, radiation resistance, effective aperture, power transfer, reciprocity and radar equation. The conditions of loading and impedance matching of wire antenna. Impedance matching of other antennas.	LO1 LO2 LO3 LO4 LO [^]	PO1 PO2	
	Mid-Term Break					

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LO-PO mapping:

		Programme Outcomes (POs)											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
Learning Outcomes LOs	LO 1	x		x		x					x	x	
	LO 2	x	x	x		x							
	LO 3	x	x	x		x		x					
	LO 4	x	x	x	x	x		x	x		x		
	LO5	x	x	x	x	x		x	x		x	x	
	LO6	x	x	x		x	x			x			

Prepared By:

Checked & Approved By:

Date:

(Head of the department ECE)

Date:

Remarks:

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