

## OPTOELECTRONICS AND OPTICAL COMMUNICATION

ETEC-403

### LECTURE PLAN

#### 1<sup>ST</sup> SESSIONAL

Lecture	Topics
1	<b>Introduction: Optical Fiber</b>
2	<b>Optical Fiber:</b> Structures
3	Wave guiding and Fabrication
4	Basic optical laws and Definition
5	Optical fiber modes and Configuration
6	Mode theory for circular waveguides
7	Single mode fibers, Graded index fiber
8	Fiber materials, Fabrication and mechanical properties
9	Advantage of Optical Communication System
10	Fiber optic cables,
11	Basic Optical Communication System
12	<b>Attenuation in Optical Fibers:</b> Introduction
13	Absorption, Scattering
14	Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.
15	<b>Wave Propagation:</b> Wave propagation in Step-Index & Graded Index Fiber,
16	Overall Fiber Dispersion-Single Mode Fibers
17	Multimode Fibers,
18	Dispersion-Shifted Fiber, Dispersion
19	Flattened Fiber, Polarization

#### 2<sup>ND</sup> SESSIONAL

Lecture	Topics
20	<b>Source &amp; Detectors:</b> Design & LED's for Optical Communicatio
21	Semiconductor Lasers for Optical Fiber Communication System and their types,
22	Semiconductor Photodiode Detector
23	Avalanche Photodiode Detector & Photo multiplier Tubes
24	Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium
25	Numerical Aperture, Laser diode to fiber coupling
26	Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain,

27	Comparison of Photo detectors. Optical receiver operation
28	Fundamental receiver operation
29	Digital signal transmission, error sources, Receiver configuration,
30	Digital receiver performance, Probability of error,
31	Quantum limit, Analog receivers
32	<b>Optical Fiber Communication Systems:</b> Data Communication Networks
33	Network Topologies,
34	Mac Protocols
35	Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier
36	WDM Network. Architectures:
37	SONET/SDH. Optical Transport Network
38	Optical Access Network, Optical Premise Network.
39	<b>Applications-</b> Military Applications, Civil, Consumer & Industrial Applications