RGPV (DIPLOMA WING) BHOPAL	OBE CURRICULUM FOR THE COURSE	FORMAT-3	Sheet No. 1/5
Branch	**OPTOELECTONICS**	**Semester**	**3**
Course Code		**Course Name**	**Analog Communication**

Course Outcome 1	Explain basic block of communication system and classify various signal, system & noise	Teach Hrs	Marks
Learning Outcome 1	Describe basic components of communication system and concept of modulation, its needs. *(Cognitive)*	4	
Contents	Block diagram of electronic communication system, distinguish between analog and digital communication, Modulation, Need for modulation and types of analog modulation techniques. **(Theory)**		
Method of Assessment	External		
Learning Outcome 2	Compare different signals, systems and noise. *(Cognitive)*	5	
Contents	Definition of signal and system **Signal:** Analog, digital, deterministic, random, energy, power, odd, even, periodic and aperiodic **System**: Linear & non-linear, time variant & invariant, causal & non-causal system. **Noise:** Classification of noise, noise measurement – SNR, Noise figure, Equivalent noise temperature, Probability of error (basic definition no derivation) **(Theory)**		
Method of Assessment	Internal		
Learning Outcome 3	Perform spectrum analysis of signal and evaluate different parameters. *(Psychomotor)*	3	
Contents	Classification of EM spectrum Measure amplitude and frequency of different signals using CRO or Spectrum Analyser.		
Method of Assessment	External		

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<tr><td>Branch</td><td colspan="3">OPTOELECTONICS</td><td>Semester</td><td colspan="2">3</td></tr>
<tr><td>Course Code</td><td></td><td>Course Name</td><td colspan="4">Analog Communication</td></tr>
<tr><td>Course Outcome 2</td><td colspan="4">Compare analog modulation techniques.</td><td>Teach Hrs</td><td>Marks</td></tr>
<tr><td>Learning Outcome 4</td><td colspan="4">Examine various aspect of amplitude modulation in different domains. (Psychomotor)</td><td>6</td><td></td></tr>
<tr><td>Contents</td><td colspan="6">(Theory)
Definition, waveform of AM, expressions of modulated signal, modulation index in terms of various voltage components (modulating voltage, carrier voltage, maximum voltage and minimum voltage), modulation index in case of simultaneous modulations, LSB and USB, Bandwidth, Power in AM wave. Solve elementary problems on modulation index, bandwidth and power.
(Practical)
To modulate a high frequency carrier with sinusoidal signal to obtain AM signal.
Measure modulation index of an AM envelope</td></tr>
<tr><td>Method of Assessment</td><td colspan="6">Internal</td></tr>
<tr><td>Learning Outcome 5</td><td colspan="4">Explain block diagram of AM transmitter and suppression of carrier methods.(Cognitive)</td><td>5</td><td></td></tr>
<tr><td>Contents</td><td colspan="6">Block diagram and description of AM transmitter using low level and high level modulation.
Suppression of carrier: BalancedModulator (using diode), Suppression of Sideband using filter method</td></tr>
<tr><td>Method of Assessment</td><td colspan="6">Internal</td></tr>
<tr><td>Learning Outcome 6</td><td colspan="4">Distinguish various analog modulation techniques.(Cognitive)</td><td>5</td><td></td></tr>
<tr><td>Contents</td><td colspan="6">SSB: Power and Bandwidth requirement, Generation using filter method and phase shift method.
Concept of VSB.
Comparison and application of AM, DSB-SC, SSB and VSB.</td></tr>
<tr><td>Method of Assessment</td><td colspan="6">External</td></tr>
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<tr><td>RGPV (DIPLOMA WING) BHOPAL</td><td colspan="3">OBE CURRICULUM FOR THE COURSE</td><td>FORMAT-3</td><td>Sheet No. 3/5</td></tr>
<tr><td>Branch</td><td colspan="3">OPTOELECTONICS</td><td>Semester</td><td>3</td></tr>
<tr><td>Course Code</td><td></td><td>Course Name</td><td colspan="3">Analog Communication</td></tr>
<tr><td>Course Outcome 3</td><td colspan="3">Analyze waveform of Angle Modulation.</td><td>Teach Hrs.</td><td>Marks</td></tr>
<tr><td>Learning Outcome 7</td><td colspan="3">Explain frequency modulation schemes and its relation with phase modulation. (Cognitive)</td><td>5</td><td></td></tr>
<tr><td>Contents</td><td colspan="5">Phase and frequency modulation and relation between phase and frequency modulation.
Frequency Modulation: definition and waveform, expressions of frequency deviation, modulation index. Relationship between frequency deviation and modulation index. Narrowband and wideband FM, Carlson's rule for bandwidth, SNR and bandwidth trade-off.</td></tr>
<tr><td>Method of Assessment</td><td colspan="5">External</td></tr>
<tr><td>Learning Outcome 8</td><td colspan="3">Describe the FM generation using direct & indirect method. (Cognitive)</td><td>4</td><td></td></tr>
<tr><td>Contents</td><td colspan="5">Direct method for FM generation: Block diagram and basic description
Indirect method for FM generation: Block diagram and description of Armstrong method
Block diagram and description of FM transmitter.</td></tr>
<tr><td>Method of Assessment</td><td colspan="5">External</td></tr>
<tr><td>Learning Outcome 9</td><td colspan="3">Install and operate angle modulation circuits on kits/simulation software. (Psychomotor)</td><td>3</td><td></td></tr>
<tr><td>Contents</td><td colspan="5">Modulate a high frequency carrier with sinusoidal signal to obtain FM signal.
Determine Modulation Index of Frequency Modulated wave.</td></tr>
<tr><td>Method of Assessment</td><td colspan="5">Internal</td></tr>
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Branch	OPTOELECTONICS		Semester	
Course Code		Course Name	Analog Communication	

Course Outcome 4	Compare demodulation techniques of AM signals.	Teach Hrs.	Marks
Learning Outcome 10	Describecharacteristics of radioreceivers. *(Cognitive)*	5	
Contents	Characteristic of radio receiver, Concept of sensitivity, selectivity, fidelity, Image frequency and its rejection. Characteristic of RF amplifier, selection of IF, Double Spotting, Noise Figure.		
Method of Assessment	External		
Learning Outcome 11	Categorize differenttypes of radioreceivers.*(Cognitive)*	6	
Contents	Detection of AM using Diode detector and practical diode detector. AM receiver- Block diagram of TRF, Super heterodyne and double super-heterodyne.		
Method of Assessment	External		
Learning Outcome 12	Set up and select particular analog de-modulation techniques circuits. *(Psychomotor)*	3	
Contents	Check the demodulated AM signal waveform using envelope detector and draw its input output waveform. Construct AM demodulator using diode circuit Locate various sections of AM radio super heterodyne receiver and draw the waveforms at input and output side of each section.		
Method of Assessment	Internal		

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Course Code		Course Name	Analog Communication

Course Outcome 5	Compare the functioning of angle de-modulators.	Teach Hrs.	Marks
Learning Outcome 13	Classify different FM de-modulators methods and outline need of pre-emphasis & de-emphasis circuits. *(Cognitive)*	5	
Contents	Block diagram of FM receiver with description **FM demodulators:** Slope detection, Balanced slop detection, Foster Seeley discriminator and Ratio detector. Need for pre-emphasis and de-emphasis circuits, SNR improvement, concept of AFC, Merits and demerits of FM over AM		
Method of Assessment	External		
Learning Outcome 14	Explain different various multiplexing techniques. *(Cognitive)*	3	
Contents	Concept of Frequency Division Multiplexing and Time Division Multiplexing and their comparison		
Method of Assessment	Internal		
Learning Outcome 15	Operate different analog radio receiver. *(Psychomotor)*	4	
Contents	Locate various sections of FM receiver and examine its working. Obtain the frequency response of Pre-emphasis and De-emphasis circuit. Demonstration of fault finding of FM radio receivers.		
Method of Assessment	External		