National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	**Bachelor of Technology in Electrical and Electronics Engineering**	Year of Regulation	**2013-14**
Department	**Electrical Engineering**	Semester	**III**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EE251	**Analog Electronics Lab**	**0**	**0**	**2**	**1**	**100**	**0**	**0**	**100**

Course Objectives	Course Outcomes		
To learn analog circuit design based on op-amp for various applications		CO1	Able to construct differential, inverting and non-inverting amplifiers, voltage follower, current–voltage, voltage-current converters, inverter, and differential amplifier using analog operational amplifier
		CO2	Able to construct summing, subtractor, scaling and averaging amplifiers, Integrator and differentiator using analog operational amplifier and analyse offset compensation, CMMR configuration for feedback circuits
		CO3	Able to construct different types of analog filters and oscillators circuits using analog operational amplifier
		CO4	Able to construct wave generators and detector circuits using analog operational amplifier
		CO5	Able to construct analog-to-digital converters and waveform rectifiers circuits using analog operational amplifier

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	**2**	**2**	**2**	**2**	**1**	**1**	**0**	**0**	**0**	**1**	**0**	**0**	**1**	**1**	**1**
2	CO2	**2**	**3**	**3**	**3**	**2**	**1**	**0**	**0**	**1**	**1**	**0**	**0**	**2**	**2**	**2**
3	CO3	**2**	**2**	**0**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**1**	**3**
4	CO4	**2**	**2**	**0**	**2**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**1**	**3**
5	CO5	**2**	**2**	**0**	**2**	**2**	**2**	**2**	**0**	**1**	**0**	**0**	**1**	**3**	**1**	**3**

SYLLABUS

No.	Content	Hours	COs
I	**Exp 1:** Design of differential, inverting and non-inverting amplifiers based on open-loop op-amp configurations.	**3**	**CO1**
II	**Exp 2:** Design of Voltage follower, Current to voltage Converter, inverter, and differential amplifier with two op-amps.	**3**	**CO1**
III	**Exp 3:** Design of Offset compensation network CMMR configuration with and without feedback, Peak amplifier	**3**	**CO2**
IV	**Exp 4:** Design of Summing, subtractor, Scaling and averaging amplifiers, Integrator and Differentiator.	**3**	**CO2**
V	**Exp 5:** Design of Active Filters; High pass, Low pass, Band pass, Band Reject and All pass Filters.	**3**	**CO3**
VI	**Exp 6:** Design of Phase shift oscillator, Wien Bridge Oscillator, Quadrature Oscillator.	**3**	**CO3**
VII	**Exp 7:** Design of Square wave generator, Triangular wave generator, Sawtooth Wave generator, comparator.	**3**	**CO4**
VIII	**Exp 8:** Zero-crossing detector, Schmitt Trigger, Voltage limiters	**3**	**CO4**
IX	**Exp 9:** Design of Analog-to-Digital converter	**3**	**CO5**
X	**Exp 10:** Design of clipper, clamper, half wave and full wave rectifiers	**3**	**CO5**
	Total Hours	**30**	

Essential Readings

1. Sedra and Smith, “Microelectronic Circuits”, Oxford University Press, 5th Edition, 2004
2. Gayakwad Ramakant, “Op-Amps and Linear Integrated Circuits”, PHI, 4th Edition, 2002.
3. Robert L. Boylestad, “Electronic Devices and Circuit Theory,” Pearson, 10th Edition, 2009

Supplementary Readings

1. Jacob Millman and C. C. Halkias, “Integrated Electronics: Analog and Digital Circuits and Systems,” McGraw-Hill Kogakusha, 2nd Edition, 2011.
2. P. Gray, P. Hurst, S. Lewis, and R. Meyer, “Analysis & Design of Analog Integrated Circuits,” Wiley, 4th Edition, 2001.