NIRMA UNIVERSITY
SCHOOL OF TECHNOLOGY, INSTITUTE OF TECHNOLOGY
M. Tech. in Electronics & Communication Engineering (VLSI Design)
M.Tech Semester - I

L	T	Practical component				C
		LPW	PW	W	S	
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Course Code	**6EC102CC22**
Course Title	**Analog and Mixed Signal Design**

Course Learning Outcomes (CLOs):

At the end of the course, students will be able to -

1. Comprehend and Design different Analog & Mixed signal circuits for various applications as per the user specifications
2. Analyze the differential amplifier and operational amplifier.
3. Design a circuit using Operational amplifier for Biomedical Applications with given specifications.

Syllabus: **Teaching Hours: 45**

UNIT I: **05**
Analog VLSI Design issues in CMOS technology, Basic MOS Models, SPICE Models and frequency dependent parameters

UNIT II: **05**
Single stage MOS amplifier, small signal and high frequency analysis

UNIT III: **05**
Differential Amplifier, current mirrors, Bandgap references

UNIT IV: **05**
Block level conceptualization of single- and two-stage opamps, Loop gain and stability; Dominant pole compensation, Folded cascode opamp, Fully differential opamps; common-mode feedback

UNIT V: **05**
Noise analysis for frontend amplifier, Classification of Noise

UNIT VI: **03**
Transistor level design for frontend amplifier, Variable Gain Amplifier

UNIT VII: **03**
Comparator design considerations , Switched capacitor circuits

UNIT VIII: **14**
Mixed signal issues in CMOS technologies, Sample-and-Hold Circuits, Analog-to-Digital Converters; Digital-to-Analog Converters, Sigma-Delta Converters

Self Study:
The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents

Laboratory Work:
Laboratory work will be based on above syllabus with minimum 10 experiments to be incorporated.

Suggested Readings:

1. Philip E. Allen, Douglas R. Holberg, CMOS Analog Circuit Design, Oxford
2. B. Razavi, Design of Analog CMOS Integrated Circuits, McGraw-Hill
3. Johns and Martin, Analog Integrated Circuit Design, Willey
4. R Jacob Baker, CMOS Circuit Design ,layout and simulation, Third Edition, Willey