



Electronics Paper-II
Principles of Digital Electronics
[CORE COURSE]

Semester: I	Credits: 2	Subject Code: BS12008	Lectures: 40
-------------	------------	-----------------------	--------------

Course Outcomes:

At the end of this course, the learner will be able to:

- Define and represent numbers in powers of base and translate one number system to another and solve binary arithmetic problems
- Identify gates, examine and simplify Boolean Algebraic assignments for designing digital circuits using K-Maps
- Analyze, design and construct combinational logic circuit.

Unit 1: Number Systems and Digital Codes	12
<ul style="list-style-type: none">Introduction to number system: decimal, Binary, Octal and hexadecimal number systems and their inter conversionsBCD, Gray codes, alphanumeric representation in ASCII codes.Unsigned and signed binary number representations, Floating pointBinary addition and binary subtraction using 2's Complement method	

Unit 2: Logic Gates and Boolean algebra	14
<ul style="list-style-type: none">Concept of logic levels, Logic gates (NOT, AND, OR, NAND, NOR, XOR) with their symbol, Boolean equation and truth tableApplications of Ex-OR gates as parity Checker and generator, Digital comparatorBoolean algebra rules and Boolean laws: Commutative, Associative, Distributive, AND, OR and Inversion laws,De Morgan's theorem, Universal gates.Simplifications of Logic equations using Boolean algebra rules.Boolean expression in SOP and POS form, conversion of SOP/POS expression to its standard SOP/POS formIntroduction to Karnaugh map, problems based on the same (up to 4 variables, K map with don't care condition), Digital Designing using K Map for: Gray to Binary and Binary to Gray Conversion.	

Unit 3: Combinational Circuits	14
<ul style="list-style-type: none">Arithmetic circuits: Half adder, full adder, half subtractor, Full subtractor, (circuit realization through k-map), Universal nibble adder /subtractor.Multiplexer: 4:1 MUX (using basic gates & NAND gates) and their applicationsDe multiplexer -1:4(using basic gates & NAND gates) and their applicationsEncoders- Decimal to BCD/Binary, 3x4 matrix keyboard encoder, concept of	

Board Of Studies	Name	Signature
Chairman (HoD)	Swatee Sarwate	<i>Swatee Sarwate</i>



- priority encoder
- Decoder-BCD to Decimal, BCD to seven segment decoders

Basic Reading:

- Floyd T.M., Jain R.P., *Digital Fundamentals*, Pearson Education
- Jain R.P., Tata McGraw Hill, *Digital Electronics*.

Reference Books:

- G.K.Kharate-*Digital Electronics*-Oxford University press
- Malvino Leach, *Digital Principles and Applications*, Tata McGraw-Hill
- M.Morris Mano, "Digital Design" 3rd Edition, PHI, New Delhi.
- Ronald J. Tocci. "Digital Systems-Principles and Applications" 6/e. PHI. New Delhi. 1999. (UNITS I to IV)
- S.Salivahana & S. Arivazhagan-*Digital Circuits and Design*

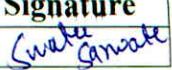
Websites:

- <https://circuitglobe.com/number-system-in-digital-electronics.html>
- <https://www.iitr.ac.in/departments/PH/uploads/Teaching%20Laboratory>
- [Electronics/5.Interconversion%20of%20Universal%20Gates%20and%20De%20Morgans%0Theorem.pdf](https://www.iitr.ac.in/departments/PH/uploads/Teaching%20Laboratory/Electronics/5.Interconversion%20of%20Universal%20Gates%20and%20De%20Morgans%0Theorem.pdf)
- http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000574EE/
- http://epgp.inflibnet.ac.in/epgpdata/uploads/epgp_content/S000574EE/P001494/M015070/ET/1459849221et10.pdf
- <https://study.com/academy/lesson/basic-combinational-circuits-types-examples.html>

E-Resources:

- NPTEL lecture series**
<https://www.youtube.com/watch?v=CeD2L6KbtVM&list=PL803563859BF7ED8C>
- NPTEL lecture series- Electronics-Digital Circuits and Systems by Prof. S. Srinivasan IIT Madras - 5,6,7,8,9 on YouTube**
<https://www.youtube.com/watch?v=gI-qXk7XojA>
- NPTEL lecture series- Electronics-Digital Circuits and Systems by Prof. S. Srinivasan IIT Madras, 3,4,11,13,14**
<https://www.youtube.com/watch?v=gI-qXk7XojA>

Contact Hours: 12 hours for Library work, practical or field work or research purposes

Board Of Studies	Name	Signature
Chairman (HoD)	Swatee Sarwate	



Board of Studies	Name	Signature (in white cell)
Chairman (HoD)	Swatee Sarwate	<i>Swatee Sarwate</i> 22/7/20
Faculty	Anitha Menon	<i>A. Menon</i> 22/7/20
VC Nominee (SPPU)	Dr. Neha Deshpande	<i>Neha Deshpande</i> 22/7/20
Subject Expert (Outside SPPU)	Dr. R.K.Kamat	<i>R.K.Kamat</i> 22/7/20
Subject Expert (Outside SPPU)	Dr. Sangeeta Kale	<i>Sangeeta Kale</i> 22/7/20
Industry Expert	Amber Mukherjee	<i>Amber Mukherjee</i> 22/7/20
Alumni	Supriya Palande	<i>Supriya Palande</i> 22/7/20

Board Of Studies	Name	Signature
Chairman (HoD)	Swatee Sarwate	<i>Swatee Sarwate</i>