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
• Introduction to number system: decimal, Binary, Octal and hexadecimal number systems and their inter conversions • BCD, Gray codes, alphanumeric representation in ASCII codes. • Unsigned and signed binary number representations, Floating point • Binary addition and binary subtraction using 2's Complement method	

Unit 2: Logic Gates and Boolean algebra	14
• Concept of logic levels, Logic gates (NOT, AND, OR, NAND, NOR, XOR) with their symbol, Boolean equation and truth table • Applications of Ex-OR gates as parity Checker and generator, Digital comparator • Boolean 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 form • Introduction 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
• 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 applications • De multiplexer -1:4(using basic gates & NAND gates) and their applications • Encoders- Decimal to BCD/Binary, 3x4 matrix keyboard encoder, concept of	

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priority encoder • Decoder-BCDto 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* "3rdEdition, 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.Intercoversion%20of%20Universal%20Gates%20and%20De
- %20Morgans%0Theorem.pdf
- 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

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

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Faculty	Anitha Menon		22/7/20
VC Nominee (SPPU)	Dr. Neha Deshpande	N.Deshpande. 22/7/20	
Subject Expert (Outside SPPU)	Dr. R.K.Kamat		22/7/20
Subject Expert (Outside SPPU)	Dr. Sangeeta Kale	22/7/20	
Industry Expert	Amber Mukherjee		22/7/20
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