| Course Number and Name |
|---|
| BEE306 &Digital Electronics |

| Credits and Contact Hours |
|---|
| 3 & 45 |

| Course Coordinator's Name |
|---|
| Dr.S.P.Vijayaragavan |

| Text Books and References |
|---|

**Text Books:**
1. Raj Kamal, 'Digital systems-Principles and Design', Pearson Education 2nd edition, 2007.
2. M. Morris Mano, 'Digital Design with an introduction to the VHDL', Pearson Education, 2013.
3. Comer "Digital Logic & State Machine Design, Oxford, 2012.

**References:**
1. Mandal "Digital Electronics Principles & Application, McGraw Hill, 2nd edition,2013.
2. Floyd and Jain, 'Digital Fundamentals', Pearson Education, 8th edition, 2003.
3. Anand Kumar, "Fundamentals of Digital Circuits, PHI, 2nd edition, 2013.
4. Charles H.Roth,Jr,Lizy Lizy Kurian John, 'Digital System Design using VHDL, Cengage, 2nd edition,2013.
5. John M.Yarbrough, 'Digital Logic, Application & Design', Thomson, 3rd edition 2002.
6. Gaganpreet Kaur, VHDL Basics to Programming, Pearson, 1st edition2013.
7. http://nptel.ac.in/courses/117106086/1

| Course Description |
|---|

To develop a strong foundation in the field of Digital Electronics. The subject gives the students an in depth knowledge about Digital logic families, Combinational circuits and enable them to analyze and design any sequential circuits. Also this subject gives knowledge about various memory devices &VHDL

| Prerequisites | Co-requisites |
|---|---|
| Basic Electrical and Electronics Engineering | Nil |
| required, elective, or selected elective (as per Table 5-1) | |
| Required | |

| Course Outcomes (COs) |
|---|

CO1: To study various number systems , simplify the logical expressions using Boolean functions
CO2: To study implementation of combinational circuits
CO3: To design various synchronous and asynchronous circuits
CO4: To introduce asynchronous sequential circuits and PLCs
CO5: To introduce digital simulation for development of application oriented logic circuits

**Student Outcomes (SOs) from Criterion 3 covered by this Course**

| COs/SOs | a | b | c | d | e | f | g | h | i | j | k | l |
|---------|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | H | M | M | H | M | | M | | H | L | L | M |
| CO2 | H | M | M | H | H | | M | | H | L | L | M |
| CO3 | H | M | | H | H | | M | | H | L | L | M |
| CO4 | H | M | | H | H | | M | | H | L | L | M |
| CO5 | H | M | M | H | H | | M | | H | L | L | M |

**List of Topics Covered**

## UNIT I        NUMBER SYSTEMS AND DIGITAL LOGIC FAMILIES        9

Review of number systems, binary codes, error detection and correction codes (Parity and Hamming code- Digital Logic Families, comparison of RTL, DTL, TTL, ECL and MOS families -operation, characteristics of digital logic family.

## UNIT II        COMBINATIONAL CIRCUITS        9

Combinational logic - representation of logic functions-SOP and POS forms, K-map representation minimization using K maps - simplification and implementation of combinational logic – multiplexers and demultiplexers - code converters, adders, subtractors.

## UNIT III        SYNCHRONOUS SEQUENTIAL CIRCUITS        9

Sequential logic- SR, JK, D and T flip flops - level triggering and edge triggering - counters - asynchronous and synchronous type - Modulo counters - Shift registers - design of synchronous sequential circuits – Moore and Melay models- Counters, state diagram; state reduction; state assignment.

## UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS AND
        PROGRAMMABLELOGIC DEVICES        9

Asynchronous sequential logic circuits-Transition table, flow table-race conditions, hazards &errors in digital circuits; analysis of asynchronous sequential logic circuits-introduction to Programmable Logic Devices: PROM – PLA –PAL.

## UNIT V        VHDL        9

RTL Design – combinational logic – Sequential circuit – Operators – Introduction to Packages – Subprograms – Test bench. (Simulation /Tutorial Examples: adders, counters, flip flops, FSM, Multiplexers / Demultiplexers).