



## University of Kerala

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                   |                    |                  |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------|------------------|
| Discipline     | ELECTRONICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                   |                    |                  |
| Course Code    | UK1DSCELE101                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                  |                   |                    |                  |
| Course Title   | Basic Electronic Technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                   |                    |                  |
| Semester       | I                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                  |                   |                    |                  |
| Academic Level | 100 – 199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                  |                   |                    |                  |
| Course Details | Credit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                  |                   |                    |                  |
| Course Summary | This course provides a comprehensive overview of electronics, covering both theoretical concepts and practical applications. Students will learn about semiconductor diodes, including their PN junctions, characteristics, and applications like LED and Zener diodes. The course also covers number systems, binary arithmetic, Boolean algebra, logic gates, and digital codes. Practical sessions focus on familiarization with tools and components, circuit building, waveform generation, and verification of gate operations. By the end of the course, students will have a strong foundation in electronic theory and hands-on experience with electronic circuits. |                  |                   |                    |                  |

### Detailed Syllabus:

| Module    | Unit | Content                                                                                                                                                      | Hrs      |
|-----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| <b>I</b>  |      | <b>Importance of Electronics</b>                                                                                                                             | <b>9</b> |
|           | 1    | Importance of Electronic Technologies in Modern Society:                                                                                                     |          |
|           | 2    | Role of electronics in different fields-Internet of Things, Artificial intelligence, Augmented reality, Virtual reality, Robotics, Biometrics.(concept only) |          |
| <b>II</b> |      | <b>Semiconductor diodes</b>                                                                                                                                  | <b>9</b> |
|           | 3    | Introduction to Electronics: Semiconductor diodes – Introduction, PN junction, PN junction with no external voltage                                          |          |
|           | 4    | Forward and Reverse biased PN junction, V-I characteristics of PN junction diode.                                                                            |          |
|           | 5    | Light Emitting Diodes-Working principle-forward reverse characteristics.                                                                                     |          |
|           | 6    | Zener diode-symbol-Voltage regulator circuit                                                                                                                 |          |

|                   |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |
|-------------------|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>III</b>        | <b>Numbersystems</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>9</b>  |
|                   | 7                    | Numbersystems:Decimal,Binary,Octal,andHexadecimalnumber systems, Binary-Decimal-Octal-Hexadecimal Inter conversions,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|                   | 8                    | SignedBinarynumbers,1'sand2'scomplementrepresentation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|                   | 9                    | Binaryarithmetic(Addition&Subtraction)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
|                   |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |           |
| <b>IV</b>         | Boolean Algebra      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>9</b>  |
|                   | 10                   | Digitalcodes – BCD,Excess 3,Gray code-conversions,ASCIIcodes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |           |
|                   | 11                   | Booleanalgebra&theorems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|                   | 12                   | SOP&POS,DeMorgan's theorem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
|                   | 13                   | SimplificationofBooleanexpressionsusingBooleanAlgebra                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|                   | 14                   | SimplificationofBooleanexpressionsusingKMap(uptofour variables).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| <b>V</b>          | <b>Logic gates</b>   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>9</b>  |
|                   | 15                   | Logicgates:AND,OR,NOT,NAND,NORandXORgates(Symbols and Truth Tables)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
|                   | 16                   | RealizationofLogicgatesusingUniversalGates                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |           |
| <b>PRACTICALS</b> |                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>30</b> |
|                   |                      | <ul style="list-style-type: none"> <li>Familiarization of Breadboard, Nose Plier, Wire Cutter, screwdriver set, connectors and insulation materials. Passive &amp; Active Components, Multimeter, Power Supply, Soldering Practice.</li> <li>ProductionofSine,square,triangularwaveformsusingFunction generator and CRO.</li> <li>StudyandidentificationofPassive&amp;ActiveComponents</li> <li>Demonstrationofonelamp controlledbyoneswitch</li> <li>Demonstration of staircase wiring: one lamp controlled by two switches</li> <li>Demonstration of house wiring - Two lamps controlled by two switches</li> <li>TruthtableverificationofGates–AND,OR,NOT,NAND, NOR. XOR.</li> <li>Toplot theVIcharacteristicsof aPN junction diode(forward)</li> <li>Toplotthe VIcharacteristicsof anLED(forward)</li> </ul> |           |

### TextBooks

1. PrinciplesofElectronics,V.K.MehtaandRohitMehta,S.Chand
2. BasicElectronics,B.L.TherajaandA.K.Theraja,S.Chand

3. ThomasL Floyd,Digital Fundamentals,Pearson,10/e, 2011

**Textfor Reference**

1. Electronics:ASystemsApproach,NeilStorey,Pearson.
2. ElectronicDevicesandCircuitTheory,RobertL.BoylestadandLouisNashelsky,Pearson
3. ElectronicTechnologiesinModern Society,JohnSmith, PHI
4. DigitalElectronics:PrinciplesandApplications"byRogerL.Tokheim
5. IntroductiontoElectronics,byEarlD.Gates
6. PracticalElectronicsfor Inventors,PaulScherzandSimonMonk,McGrawHill
7. ElectronicsLabManual,VOL-1,Fifth Edition,KA Navas

**Course Outcomes**

| No.  | Uponcompletionofthecoursethegraduatewillbe able to        | Cognitive Level | PSO addressed |
|------|-----------------------------------------------------------|-----------------|---------------|
| CO-1 | Infertheroleof electronicsindifferentfields               | U               | PSO 2,3,7     |
| CO-2 | Associatevarioustypesofdiodes,working&characteristics     | R , U           | PSO 1,5,7     |
| CO3  | Analyzenumbersystem &codeconversion                       | U,An            | PSO 1,4,7     |
| CO4  | Interpretdigitalcoding&verificationofBoolean expressions. | U,An            | PSO 2,3,7     |
| CO5  | Summarizewithgates andtheirapplications                   | U,Ap            | PSO 2,3,7     |

**R-Remember,U-Understand,Ap-Apply,An-Analyse,E-Evaluate,C-Create**

*Note:1 or 2 COs/module*



### University of Kerala

|                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                   |                    |                  |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------|------------------|
| Discipline     | ELECTRONICS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                  |                   |                    |                  |
| Course Code    | UK2DSCELE100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                  |                   |                    |                  |
| Course Title   | Digital Electronics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                  |                   |                    |                  |
| Semester       | II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                  |                   |                    |                  |
| Academic Level | 100 -199                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                  |                   |                    |                  |
| Course Details | Credit                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                  |                   |                    |                  |
| Course Summary | <p>This course covers the fundamentals of digital electronics, focusing on combinational and sequential circuits. In the first module, students learn about adders, subtractors, and flip-flops. The second module covers comparators, decoders, encoders, and code converters. The third module introduces multiplexers, demultiplexers, and their applications in realizing Boolean expressions. Shift registers and their applications, such as latches, are discussed in the fourth module. The fifth module explores counters, including state diagrams, asynchronous and synchronous counters, and their designs. Practical sessions complement theoretical learning, reinforcing concepts through hands-on experiments with flip-flops, encoders, decoders, multiplexers, demultiplexers, and counters. Students gain practical skills in implementing digital circuits using logic gates and flip-flops, enhancing their understanding of digital electronics principles.</p> |                  |                   |                    |                  |

#### Detailed Syllabus:

| Module    | Unit                                                    | Content                                                             | Hrs      |
|-----------|---------------------------------------------------------|---------------------------------------------------------------------|----------|
| <b>I</b>  | <b>Combinational circuits &amp; Sequential circuits</b> |                                                                     | <b>9</b> |
|           | 1                                                       | Binary addition and subtraction.                                    |          |
|           | 2                                                       | Adders-Half adder and Full adder.                                   |          |
|           | 3                                                       | Subtractors-Half and Full subtractor                                |          |
|           | 4                                                       | Flip Flops: RS, D, JK, T and Master slave                           |          |
| <b>II</b> | <b>Comparators &amp; Decoders</b>                       |                                                                     | <b>9</b> |
|           | 5                                                       | Comparators-1-bit magnitude & 2-bit magnitude.                      |          |
|           | 6                                                       | Decoders-2 to 4 & 3 to 8. Encoders-Octal to Binary & Decimal to BCD |          |
|           | 7                                                       | Code converters-Gray to Binary, Binary to Gray and Binary to BCD    |          |
|           | <b>Multiplexers &amp; Demultiplexers</b>                |                                                                     | <b>9</b> |
|           | 8                                                       | Multiplexers: 2 input, 4 input & 8 input.                           |          |

|                   |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|-------------------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <b>III</b>        | 9                     | Demultiplexers:1to 4& 1to 8.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |           |
|                   | 10                    | RealizationofBooleanexpressionusingmultiplexersand demultiplexers.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|                   | 11                    | Familiarizationofpopular ICs:7483,74151,74154anditsapplications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
| <b>IV</b>         | <b>Shiftregisters</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>9</b>  |
|                   | 12                    | Applications–Latches,typicalcircuits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |
|                   | 13                    | Shift registers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|                   | 14                    | SISO,SIPO,PISO,PIPO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |           |
|                   | 15                    | ApplicationsasRingcounterandJohnsoncounter.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| <b>V</b>          | <b>Counters</b>       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>9</b>  |
|                   | 16                    | Statediagram&Statetable.Asynchronouscounters:Conceptsand Design of 2bit & 4 bit Up/Down counter,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|                   | 17                    | MOD10 up counter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|                   | 18                    | Synchronous counters                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |
| <b>PRACTICALS</b> |                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>30</b> |
|                   |                       | <ul style="list-style-type: none"> <li>● Verifythetruth tables ofSR andJK flip-flops</li> <li>● BinarytoBCD converter</li> <li>● OctaltoBinaryencoder usingGates.</li> <li>● HalfAddercircuitsusinglogic gates</li> <li>● FullAdder circuitsusinglogic gates</li> <li>● 1bitmagnitude comparatorusing gates</li> <li>● Realizationof4to 1MUXusing gates</li> <li>● Realization of1to4Demultiplexerusing gates</li> <li>● Realisationofasynchronousdecadeupcounterusingflip flops</li> <li>● RealisationofShiftregisters-SISO,SIPO,PISO,PIPOusing flip flops.</li> <li>● Realisationofasynchronousdecadeupcounterusingflip flops.</li> </ul> |           |

#### TextBooks

1. AnandKumar, Fundamentals of digital circuits, PHI, 2/e, 2012.
2. ThomasLFloyd, Digital Fundamentals, Pearson, 10/e, 2011.

#### TextforReference

1. JohnMYarbrough, Digital logic-Application and Design, Thomson Learning, 2006.
2. JohnWakerly, Digital Design Principles and Practice, Pearson, 4/e, 2012.
3. Electronics Lab Manual, VOL-1, Fifth Edition, KANavas
4. MorrisMano, Ciletti, Digital Design, 4/e, Pearson, 4/e, 2009
5. ThomasA.DeMessa, ZackCiecone: Digital Integrated Circuits, Wiley India, 2007
6. Ghoshal, Digital Electronics, Cengage, 2012.
7. Malvino&Leach, Digital principles and applications, TMH.

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to | Cognitive Level | PSO addressed |
|------|------------------------------------------------------------|-----------------|---------------|
| CO-1 | Summarize combinational and sequential circuits            | U               | PSO-1,2       |
| CO-2 | Analyze comparators, decoders & code converters            | R, U            | PSO2,3        |
| CO3  | Summarize MUX, DEMUX & Boolean expressions.                | U, An           | PSO2,3,4      |
| CO4  | Apply Latches, Shift registers and counters                | An, Ap          | PSO2,3,4,7    |
| CO5  | Infer the application of counters                          | Ap              | PSO2,3,4,7    |

**R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create**

*Note: 1 or 2 COs/module*



## University of Kerala

|                |                                                                                                                                                                                                                                                                                                                                                    |                  |                   |                    |                  |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------|--------------------|------------------|
| Discipline     | <b>ELECTRONICS</b>                                                                                                                                                                                                                                                                                                                                 |                  |                   |                    |                  |
| Course Code    | <b>UK3DSCELE201</b>                                                                                                                                                                                                                                                                                                                                |                  |                   |                    |                  |
| Course Title   | <b>Microprocessor Architecture and Applications</b>                                                                                                                                                                                                                                                                                                |                  |                   |                    |                  |
| Type of Course | <b>DSC</b>                                                                                                                                                                                                                                                                                                                                         |                  |                   |                    |                  |
| Semester       | <b>III</b>                                                                                                                                                                                                                                                                                                                                         |                  |                   |                    |                  |
| Academic Level | <b>200 -299</b>                                                                                                                                                                                                                                                                                                                                    |                  |                   |                    |                  |
| Course Details | Credit                                                                                                                                                                                                                                                                                                                                             | Lecture per week | Tutorial per week | Practical per week | Total Hours/Week |
|                | <b>4</b>                                                                                                                                                                                                                                                                                                                                           | 3 hours          | -                 | 2 hours            | 5                |
| Pre-requisites | 1. Basic concept of computer<br>2. Understanding the functional units of a standard PC                                                                                                                                                                                                                                                             |                  |                   |                    |                  |
| Course Summary | This course provides a foundation on the fundamentals of microprocessors and applications. It focuses on the architecture, assembly language programming, interrupt handling and interfacing of microprocessors with peripheral devices. It helps the learner to extend the study of latest processors and develop novel hardware based solutions. |                  |                   |                    |                  |

### Detailed Syllabus:

| Module     | Unit                                              | Content                                                                                                          | Hrs       |
|------------|---------------------------------------------------|------------------------------------------------------------------------------------------------------------------|-----------|
| <b>I</b>   | <b>Introduction to microprocessors</b>            |                                                                                                                  | <b>6</b>  |
|            | 1                                                 | Overview of microprocessors and their importance in modern computing                                             |           |
|            | 2                                                 | Basic architecture and components of a microprocessor.                                                           |           |
|            | 3                                                 | Types of microprocessors and their applications                                                                  |           |
| <b>II</b>  | <b>Architecture of Intel 8086 microprocessor</b>  |                                                                                                                  | <b>10</b> |
|            | 4                                                 | Introduction to Intel 8086 microprocessor.                                                                       |           |
|            | 5                                                 | Architecture and pin organization of Intel 8086 microprocessor                                                   |           |
|            | 6                                                 | EU and BIU, Min/Max signals                                                                                      |           |
|            | 7                                                 | Register organization, Memory segmentation and addressing in Intel 8086                                          |           |
| <b>III</b> | <b>Programming with Intel 8086 Microprocessor</b> |                                                                                                                  | <b>12</b> |
|            | 8                                                 | Introduction to assembly language programming                                                                    |           |
|            | 9                                                 | Instruction format and addressing modes in assembly language                                                     |           |
|            | 10                                                | Instruction set architecture of Intel 8086                                                                       |           |
|            | 11                                                | Assembly language programming concepts: data movement, arithmetic and logical operations, branching, and looping |           |
|            | 12                                                | Writing simple programs using Intel 8086 assembly language                                                       |           |
| <b>IV</b>  | <b>Input Output operations with 8086</b>          |                                                                                                                  | <b>9</b>  |
|            | 13                                                | Interrupts and interrupt handling mechanism                                                                      |           |

|          |    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|----------|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|          | 14 | Overview of I/O operations and interfacing.                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
|          | 15 | I/O port addressing and I/O instructions in Intel 8086                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |           |
|          | 16 | Introduction to 8255 IC (Block diagram only).                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|          | 17 | Interfacing I/O devices like LED and switch with Intel 8086                                                                                                                                                                                                                                                                                                                                                                                                                                                              |           |
|          |    | <b>Microprocessor</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |           |
| <b>V</b> |    | <b>Advanced Programming Concepts</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>8</b>  |
|          | 18 | Advanced technologies like pipelining and multiprocessing - Stages of pipelining - advantages.                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
|          | 19 | Comparison of 8086 microprocessor families (such as 8088, 80186, and 80286) - Features only.                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|          | 20 | Real-world applications and case studies involving Intel 8086 microprocessor                                                                                                                                                                                                                                                                                                                                                                                                                                             |           |
|          |    | <b>Practical Session</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>30</b> |
|          |    | <b>8086 Assembly Language programming using kit/MASM/TASM</b><br><br><b>(Minimum 4 )</b><br><br>1. Familiarisation of 8086 microprocessor<br>2. Arithmetic operations (Addition, subtraction, multiplication and division) of two 8/16 bit numbers<br>3. Square and square root.<br>4. Sorting of arrays in ascending and descending order.<br>5. Biggest/smallest of two numbers<br>6. Block transfer<br>7. BCD to Binary conversion<br>8. Simple interfacing programs for input/output devices such as LED and Switch. |           |

#### TEXT BOOK(S):

1. The 8086 Microprocessors- Architecture, Programming and Interfacing – Lyla B Das – Pearson, Second edition.
2. 8086 Microprocessor and Applications, Nagoor Kani, 3Ed, PHI, 2011

#### REFERENCES:

1. The 8088 and 8086 Microprocessors – Programming, Interfacing, Software and Hardware Applications by Walter A. Triebel & Avatar Singh, Pearson Fourth Edition,
2. Microprocessor 8086 Architecture, Programming and Interfacing, Sunil Mathur, PHI, 2011



3. The Intel Microprocessors: Architecture, Programming and Interfacing - Barry B. Brey Pearson - 8th Edition

4. Microprocessor and Microcontroller - R. Theagarajan - SCITECH - 2010

## Course Outcomes

| No.  | Upon completion of the course the graduate will be able to                                                         | Cognitive Level | PSO addressed |
|------|--------------------------------------------------------------------------------------------------------------------|-----------------|---------------|
| CO-1 | Develop the idea of Microprocessor and its role in computing world                                                 | R, U            | PSO-4         |
| CO-2 | Illustrate the architecture, modes of operation and addressing modes of microprocessors                            | R, U            | PSO-4         |
| CO-3 | Develop 8086 assembly language programming skills.                                                                 | U, Ap, C        | PSO-1,2,3,4,8 |
| CO-4 | Demonstrate interrupts, its handling                                                                               | U, Ap,          | PSO-4         |
| CO-5 | Illustrate the interfacing of 8086 microprocessor with input output devices                                        | R, U, Ap, C     | PSO-2,3,4,8   |
| CO-6 | Understand and evaluate the advanced programming techniques and compare the features of 8086 microprocessor family | R, U, An        | PSO-4,7       |

**R-Remember, U-Understand, Ap-Applied, An-Analyse, E-Evaluate, C-Create**

*Note: 1 or 2 COs/module*