# K L University
(Koneru Lakshmaiah Education Foundation)
Estd. u/s 3 of UGC Act 1956
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Constituent College KLCE  Accredited by NAAC with CGPA 3.76/4.00
Approved by A.I.C.T.E ± Accredited by N.B.A.± ISO 9001-2000 Certified

## DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

| S.No | Course Code | Course Title | Offered in Even/ Odd Sem. | L-T-P | Credits | Pre-requisite | Compulsory/Option |
|---|---|---|---|---|---|---|---|
| **HUMANITIES AND SOCIAL SCIENCES (HS)    -    CREDITS – 10 (except for Bio Tech), 8 (for Bio Tech only)** | | | | | | | |
| 1. | 13-HS 101 | English | Even & Odd | 2-0-2 | 3 | Nil* | Compulsory |
| 2. | 13-HS-102 | Language and Reasoning Skills | Even & Odd | 2-0-2 | 3 | Nil* | Compulsory |
| 3. | 11-BS-105 | Ecology & Environment | Even & Odd | 2-0-0 | 2 | Nil* | Compulsory( Except for Bio Technology) |
| 4. | 13-HS-104 | Human Values | Even & Odd | 2-0-0 | 2 | Nil* | Compulsory |
| **BASIC SCIENCES (BS)  -     CREDITS – 22 ( except for Bio Tech), 24 ( only for Bio Tech)** | | | | | | | |
| 1. | 13-BS -101 | Linear Algebra and multivariate calculus | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 2. | 13-BS -102 | Differential Equations | Even & Odd | 3-1-0 | 4 | Nil* | Compulsory |
| 3. | 13-BS-103 | Engineering Physics | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 4. | 11-BS -104 | Engineering Chemistry | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 5 | 13BS104 | Basic Mathematics | Odd | 3-0-0 | 3 | Nil* | BT(Bi. P. C students only) |
| 6 | 13BS107 | Organic Chemistry | Even and Odd | 2-0-0 | 2 | Nil* | BT only |
| 7 | 13BS108 | Fundamentals of Biology | Odd | 3-0-0 | 3 | Nil* | BT(M.P.C students only) |
| 8. | 13-BS-201 | Mathematical Methods | Even & Odd | 3-0-0 | 3 | Nil* | Compulsory (Except for Bio Tech) |
| 9 | 13BS202 | Complex variables and discrete mathematics | Even | 3-0-0 | 3 | Nil* | EEE,ME,ECE only |
| 10 | 13BS203 | Complex variables and finite Differential methods | Even | 3-0-0 | 3 | Nil* | Compulsory CE only |
| 11 | 13BS204 | Probability and Statistics | Even | 3-0-0 | 3 | Nil* | BT only |
| 12. | 13-BS-206 | Discrete Mathematics | Even & Odd | 3-0-0 | 3 | Nil* | Compulsory for CSE |
| **ENGINEERING SCIENCES (ES) –    CREDITS – 38** | | | | | | | |
| 1. | 13-ES- | Engineering Materials | Even & | 3- | 3 | Nil* | Compulsory |

| | | | Odd | 0-0 | | | |
|------|----------------|-------------------------------------|-----------------|-----------|---|-----------|------------|
| 2. | 13-ES-102 | Measurements | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 3. | 11-ES - 104 | Engineering Graphics with CAD | Even & Odd | 0-0-4 | 2 | Nil* | Compulsory |
| 4. | 13-ES - 105 | Workshop Practice | Even & Odd | 0-0-4 | 2 | Nil* | Compulsory |
| 5. | 13-ES-101 | Problem Solving through Programming | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 6. | 13-ES - 106 | Engineering Mechanics | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 7. | 13-ES - 201 | Thermodynamics | Even & Odd | 3-0-0 | 3 | Nil* | Compulsory |
| 8. | 13-ES - 202 | Object Oriented Programming | Even & Odd | 3-0-2 | 4 | 13-ES-101 | Compulsory |
| 9. | 13-ES - 203 | Network Theory | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 10. | 13-ES - 204 | Data Structures | Even & Odd | 3-0-2 | 4 | 13-ES-101 | Compulsory |
| 11. | 13-ES - 205 | Signal Processing | Even & Odd | 3-0-2 | 4 | Nil* | Compulsory |

## PROFESSIONAL CORE* -  CREDITS – 60

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 13-CS-201 | Digital Logic Design & Computer Organization | Odd | 3-0-2 | 4 | Nil* | Compulsory |
| 2. | 13-CS-202 | Human Computer Interaction | Odd | 3-0-2 | 4 | 13ES101 | Compulsory |
| 3. | 13-CS-203 | Operating Systems | Even | 3-0-2 | 4 | Nil* | Compulsory |
| 4. | 13-CS-204 | Database Management System | Even | 3-0-2 | 4 | 13ES204 | Compulsory |
| 5. | 13-CS-205 | Computer Networks | Even | 3-0-2 | 4 | Nil* | Compulsory |
| 6. | 11-EC-311 | Microprocessor & Microcontrollers | Odd | 3-0-2 | 4 | 13CS201 | Compulsory |
| 7. | 11-EM-301 | Internet Programming | Odd | 3-0-2 | 4 | 13ES202 | Compulsory |
| 8. | 13-CS-301 | Software Engineering | Odd | 3-0-2 | 4 | 13ES202 | Compulsory |
| 9. | 13-CS-302 | Design and Analysis of Algorithms | Odd | 3-0-2 | 4 | 13ES204 | Compulsory |
| 10. | 13-CS-303 | Information Assurance and Security | Odd | 3-0-2 | 4 | 13CS205 | Compulsory |
| 11. | 13-CS-304 | Artificial Intelligence | Even | 3-0-2 | 4 | 13ES204 | Compulsory |
| 12. | 13-CS-305 | Distributed Computing | Even | 3-0-2 | 4 | 13CS205 | Compulsory |
| 13. | 13-CS-306 | Automata Theory and Formal Languages | Even | 3-0-2 | 4 | 13BS206 | Compulsory |
| 14. | 13-CS-401 | Compiler Design | Odd | 3-0-2 | 4 | 13 CS 306 | Compulsory |
| 15. | 13-CS-402 | Simulation and Modeling | Odd | 3-0-2 | 4 | 13 BS 206 | Compulsory |

**\*All these courses will consist of either a Project based Lab / Project Outcome through course work adapting Case Study / Capstone Model.**
**These Courses will have a definite Pre-Requisite, which must be framed from either Basic Sciences (BS) / Engineering Sciences (ES) or from within these Courses.**

**PROFESSIONAL ELECTIVE STREAMS -  CREDITS -15 (Any Five)**
**( These courses will have definite Pre-Requisites from within Professional Core Courses)**

### DATA ENGINEERING STREAM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 13-CS-331 | Data warehousing and Mining | Even | 3-0-0 | 3 | | |
| 2. | 13-CS-332 | Advanced Database Management System | Even | 3-0-0 | 3 | | |
| 3. | 13-CS-333 | Database Security | Odd | 3-0-0 | 3 | 13 CS 204 | Any Five (To get a specialization choose any Four from the same stream) |
| 4. | 13-CS-431 | Distributed Databases | Odd | 3-0-0 | 3 | | |
| 5. | 13-CS-432 | Big data Analytics | Odd | 3-0-0 | 3 | | |

### COMPUTER NETWORKS STREAM

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 13-CS-334 | TCP/IP Protocol Suite | Even | 3-0-0 | 3 | 13 CS 205 | |

| | | | | | | |
|----|-----------|-------------------------------------------|------|------------|---|-------------------|
| 2. | 13-CS-335 | Network Programming | Even | 3-0-0 | 3 | |
| 3. | 13-CS-336 | Routing Algorithms | Odd | 3-0-0 | 3 | 13 CS 205 |
| 4. | 13-CS-433 | High speed Optical Communication Networks | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-434 | Wireless Communications and Networking | Odd | 3-0-0 | 3 | |

**SOFTWARE ENGINEERING   STREAM**

| | | | | | | |
|----|-----------|---------------------------------|------|-------|---|-----------|
| 1. | 13-CS-337 | Object Oriented Analysis and Design | Even | 3-0-0 | 3 | |
| 2. | 13-CS-338 | Requirement Engineering | Even | 3-0-0 | 3 | |
| 3. | 13-CS-339 | Software Testing  & Quality Assurance | Odd | 3-0-0 | 3 | 13 CS 301 |
| 4. | 13-CS-435 | Software Reliability | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-436 | Software Project Management | Odd | 3-0-0 | 3 | |

**SECURITY   STREAM**

| | | | | | | |
|----|-----------|---------------------------|------|-------|---|---------|
| 1. | 13-CS-340 | Secure Programming | Even | 3-0-0 | 3 | |
| 2. | 13-CS-341 | Crypt Analysis | Even | 3-0-0 | 3 | |
| 3. | 13-CS-342 | Elliptic curve Cryptography | Odd | 3-0-0 | 3 | 13CS205 |
| 4. | 13-CS-437 | Cyber Security | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-438 | Trust Worthy Computing | Odd | 3-0-0 | 3 | |

**PARALLEL & DISTRIBUTED COMPUTING STREAM**

| | | | | | | |
|----|-----------|-------------------------------|------|-------|---|-------------------|
| 1. | 13-CS-343 | Advanced Computer Architecture | Even | 3-0-0 | 3 | 13CS201 / 13EM201 |
| 2. | 13-CS-344 | Parallel Computing | Even | 3-0-0 | 3 | |
| 3. | 13-CS-345 | Grid Computing | Odd | 3-0-0 | 3 | 13CS201 |
| 4. | 13-CS-439 | Cloud Computing | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-440 | High Performance Computing | Odd | 3-0-0 | 3 | |

**GRAPHICS & MULTIMEDIA   STREAM**

| | | | | | | |
|----|-----------|-------------------------|------|-------|---|---------|
| 1. | 13-CS-346 | 2D/3D Graphics | Even | 3-0-0 | 3 | |
| 2. | 13-CS-347 | Digital Image Processing | Even | 3-0-0 | 3 | 13CS202 |
| 3. | 13-CS-348 | Animation | Odd | 3-0-0 | 3 | |

Any Five (To get a specialization choose any Four from the same stream)

| | | | | | | |
|---|---|---|---|---|---|---|
| 4. | 13-CS-441 | Video and Audio Streaming | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-442 | Multimedia Technologies | Odd | 3-0-0 | 3 | |

**INTELLIGENT COMPUTING STREAM**

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1. | 13-CS-349 | Soft Computing | Even | 3-0-0 | 3 | |
| 2. | 13-CS-350 | Machine Learning | Even | 3-0-0 | 3 | |
| 3. | 13-CS-351 | Natural Language Processing | Odd | 3-0-0 | 3 | 13CS304 |
| 4. | 13-CS-443 | Multi Agent Systems | Odd | 3-0-0 | 3 | |
| 5. | 13-CS-444 | Computer Vision | Odd | 3-0-0 | 3 | |

**EMBEDDED SYSTEMS STREAM**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | 11-EM-330 | Real Time Operating Systems | Even | 3-0-0 | 3 | 13 CS 203 |
| 2. | 13-EM-332 | PCB Design | Even | 3-0-0 | 3 | Nil* |
| 3. | 11-EM-334 | Micro controllers Interfacing & System Design | Odd | 3-0-0 | 3 | |
| 4. | 11-EM-430 | Advanced Embedded Processor Architectures | Odd | 3-0-0 | 3 | 11 EC 311 |
| 5. | 11-EM-432 | Hardware Software Co - Design | Odd | 3-0-0 | 3 | |

**WEB TECHNOLOGIES  STREAM**

| | | | | | | |
|---|---|---|---|---|---|---|
| 1. | 13-EM-331 | Web Programming | Even | 3-0-0 | 3 | |
| 2. | 13-EM-333 | Visual Programming | Even | 3-0-0 | 3 | |
| 3. | 13-EM-335 | Web Middleware and Web Services | Odd | 3-0-0 | 3 | 11EM301 |
| 4. | 13-EM-431 | Enterprise Programming | Odd | 3-0-0 | 3 | |
| 5. | 13-EM-433 | Semantic Web | Odd | 3-0-0 | 3 | |

| | | MANAGEMENT ELECTIVE, Credits: 3 | | | | | |
|---|---|---|---|---|---|---|---|
| 1. | 11- HS- 201 | Emotional Intelligence | Even & Odd | 3-0-0 | 3 | | |
| 2. | 11- HS -202 | Paradigm in Management | Even & Odd | 3-0-0 | 3 | | |
| 3. | 11- HS -203 | Indian Economy | Even & Odd | 3-0-0 | 3 | | |
| 4. | 11 –HS-205 | Professional Ethics & Values | Even & Odd | 3-0-0 | 3 | | |
| 5. | 11-HS -206 | Behavioral Sciences | Even & Odd | 3-0-0 | 3 | | |
| 6. | 11 HS-208 | Managing Personal Finances | Even & Odd | 3-0-0 | 3 | | |
| 7. | 11-HS-209 | Basics of Marketing for Engineers | Even & Odd | 3-0-0 | 3 | | Any ONE |
| 8. | 11-HS-210 | Self Management | Even & Odd | 3-0-0 | 3 | | |
| 9. | 11-HS-211 | Organization Management | Even & Odd | 3-0-0 | 3 | | |
| 10. | 13-HS-212 11hs212 | Resource Safety & Quality Management | Even & Odd | 3-0-0 | 3 | | |
| 11. | 13-HS-213 11OE414 | Disaster Management | Even & Odd | 3-0-0 | 3 | | |
| | | AUDITED COURSES | | | | | |
| 1. | 13-AC-201 | Energy & Society | Even & Odd | | NIL | NIL | Compulsory |
| 2. | 13-AC-202 | Employability Skills | Even & Odd | | NIL | NIL | Compulsory |
| 3. | 13-AC-301 | Advanced Employability Skills | Even & Odd | | | | Compulsory |
| 4. | 13-AC-203 | Sports / Games / Yoga | Even & Odd | | NIL | NIL | Compulsory |
| 5. | 13-AC-204 | NCC /NSS /NSO/CEA | Even & Odd | | NIL | NIL | Compulsory |
| 6. | 13-AC-302 | Quantitative Aptitude and Reasoning | Even & Odd | | NIL | NIL | Compulsory |
| | | NON-CREDIT COURSES: | | | | | |
| 1. | 13-NC-201 | Certificate Course-1 | Even & Odd | 0-0-2 | NIL | NIL | Compulsory |
| 2. | 13-NC-202 | Certificate Course -2 | Even & Odd | 0-0-2 | NIL | NIL | Compulsory |
| | | TERM PAPER | | | | | |
| 1. | 13- TP-401 | Term Paper | Even | 0-0-4 | 2 | | Compulsory |
| 2 | 13-MP401 | Miniproject | Odd | 0-0-6 | 3 | | Compulsory |
| | | PROJECT OR PRACTICE SCHOOL | | | | | |
| 1. | 13PW401 | Final year Project | Even or Odd | 0-0-18 | 9 | NIL | Any one |
| 2. | 13PS401 | Practice School | Even or Odd | | | NIL | |

**OPEN ELECTIVE  - CREDITS – 9  (Any Three )**
**(These Courses have to be taken only from across the Department,**
**These Courses cannot be opted from the same discipline, any such special case needs the**
**approval of respective B.O.S. Chairman)L-T-P Structure for such courses will be 3-0-0 and**

| | | | | | | |
|---|---|---|---|---|---|---|
| **Credits for each such course will be 3.** | | | | | | |
| **OPEN ELECTIVES OFFERED BY CSE** | | | | | | |
| 1 | 13OE429 | Fundamentals of IT | Even or Odd | 3-0-0 | 3 | NIL |
| 2 | 12OE445 | Fundamentals of DBMS | Even or Odd | 3-0-0 | 3 | NIL |
| 3 | 13OE430 | Self Development | Even or Odd | 3-0-0 | 3 | NIL |