# ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI (AUTONOMOUS) B.Tech-CSE(DATA SCIENCE) (Effective for the batches admitted in 2022-23)

| S1. | Category | Course Code | Course Title                                    | Ho | urs j<br>week | per | Credits | CIE | SEE | TOTAL |
|-----|----------|-------------|---|----|---------------|-----|---------|-----|-----|-------|
|     |          |             |   | L  | Т             | Р   | С       |     |     |       |
| 1   | BS       | 20ABS9904   | Chemistry                                       | 3  | 0             | 0   | 3       | 30  | 70  | 100   |
| 2   | BS       | 20ABS9911   | Probability and Statistics                      | 3  | 0             | 0   | 3       | 30  | 70  | 100   |
| 3   | ES       | 20AES0505   | Information Technology and<br>Numerical Methods | 3  | 0             | 0   | 3       | 30  | 70  | 100   |
| 4   | ES       | 20AES0502   | Data Structures                                 | 3  | 0             | 0   | 3       | 30  | 70  | 100   |
| 5   | ES       | 20AES0509   | Python Programming                              | 1  | 0             | 4   | 3       | 30  | 70  | 100   |
| 6   | ES LAB   | 20AES0506   | Computer Science and<br>Engineering Workshop    | 0  | 0             | 3   | 1.5     | 30  | 70  | 100   |
| 7   | BS LAB   | 20ABS9909   | Chemistry Lab                                   | 0  | 0             | 3   | 1.5     | 30  | 70  | 100   |
| 8   | ES LAB   | 20AES0504   | Data Structures Lab                             | 0  | 0             | 3   | 1.5     | 30  | 70  | 100   |
| 9   | MC       | 20AMC9903   | Environmental Studies                           | 2  | 0             | 0   | 0       | 30  | 0   | 30    |
|     |          |             | Total credits                                   |    |               |     | 19.5    | 270 | 560 | 830   |

# Semester II (First year)

| Cours  | e Code   |   |  |   |   | <b>C</b> 1   | omiotre  | -   |   |  | L  | Т  | Р  |  | С   |
|--|--|---|--|---|---|--|--|---|---|--|--|--|--|--|---|
| 20AB   | 8S9904   |   |  |   |   | Ch   | lemistry   | <b>y</b>  |   |  | 3  | 0  | 0  |  | 3   |
| Pre-re   | quisite  | Ba  | isics of   | chemic  | cal form  | ulas ar  | nd equat   | tions   | Ser   | nester   |  |  | I –  | II   |   |
| Course (   | Dutcom   | es (CO)   | :  |   |   |  |  |   |   |  |  |  |  |  |   |
| CO1: In<br>mater a<br>CO2: Ap<br>CO3: Ou<br>CO4: Ar  | iterpret t<br>nd energ<br>oply the e<br>utline the<br>nalyze the   | he beha<br>y at both<br>electroch<br>e prepara<br>e separa<br>d the dis   | viour and<br>1 the atomical provident of the second s | d interac<br>mic and<br>principles<br>echanism<br>aseous a  | ctions be<br>molecula<br>s to the c<br>n propert<br>and liquic  | etween m<br>ar levels<br>construct<br>ties and<br>1 mixture<br>water in  | tion of be<br>applications<br>of the substant  | d energy<br>etteries,<br>ons of p<br>instrum  | v at both<br>fuel cells<br>olymer a<br>ental me   | the atom<br>and electric<br>nd conductions are<br>rially and   | mic and<br>ctrochem<br>ucting po<br>nd their a   | molect<br>nical se<br>olymer<br>applica  | ular 1<br>ensor<br>tions                         | levels<br>rs<br>s  | between   |
| UNIT - 1   |  | St  | ructure  | e and B   | onding  | Models   | 3<br>3   | cally all   | u muusi   | lially all   | 10   | Hrs  |  | aunen  |   |
| Planck's<br>particle i<br>level diag<br>propertie<br>diagrams<br>UNIT –<br>Electrode<br>electroch<br>and appl<br>concept<br>working<br>sensors v<br>Primary<br>methano<br>Seconda<br>cell react<br>UNIT –<br>Introduct<br>polymeriz<br>polymer i<br>Plastics | quantu<br>n a box<br>grams fo<br>s, mole<br>of O <sub>2</sub> ,<br><b>II</b><br>es - co<br>emical of<br>lications<br>of cond<br>and app<br>with exa<br><b>cells</b> -<br>l fuel ce<br><b>ry cells</b><br>ions<br><b>III</b><br>tion to p<br>zation,<br>formatic<br>- Therm | m theo<br>and the<br>or transecular of<br>$N_2$ and<br>I El<br>oncepts<br>cell, Ne<br>of pH<br>uctivity<br>polication<br>mples,<br>Zinc-a<br>Ills – wo<br>Ills – lead<br>I P<br>oolymer<br>copolyren<br>on. | ry, Sch<br>eir appl<br>ition me<br>orbital t<br><u>CO, cal</u><br>ectroch<br>, refere<br>rn'st eq<br>metry<br>, condu<br>ns, phot<br>ampero<br>air batte<br>rking of<br>acid, n<br><b>Polymer</b><br>s, funct<br>nerization  | rodinge<br>lication<br>etal ion<br>culation<br><b>nemistr</b><br>ence el<br>uation,<br>(acid-ba<br>uctivity<br>togalvar<br>metric s<br>ery, alk<br>f the cel<br>ickel-m<br><b>Chemi</b><br>ionality<br>on (ster | r wave<br>s for co<br>s – split<br>- bondin<br>n of bon<br>y and A<br>ectrodes<br>cell pot<br>ase titra<br>cell, co<br>nic cells<br>sensors<br>cali met<br>ls.<br>tetal hyd<br>stry<br>of mon<br>reospect | equation<br>njugate<br>ting of<br>ng in h<br>d order<br><b>Applica</b><br>s (Calc<br>tential of<br>ations),<br>onducto<br>with s<br>with ex-<br>al sulp<br>dride an<br>omers,<br>ific pol- | on, sign<br>on, sign<br>orbital's<br>omo- ar<br><b>tions</b><br>omel eleccalculati<br>potenti-<br>metric<br>pecific e<br>camples<br>hide ba<br>nd lithiu<br>chain g<br>ymeriza | ificance<br>ules, c:<br>in tetr<br>ad hete<br>ectrode<br>ions, nu<br>ometry<br>titration<br>example | e of $\Psi^1$<br>rystal fi<br>ahedral<br>ronucle<br>, Ag/A<br>umerica<br>- poten<br>ns (acid<br>es. Elec<br>buttor<br>batterie<br>and step<br>ith spe<br>erties a | and Ψ<br>eld theo<br>and oc<br>ar diato<br>gCl ele<br>l proble<br>tiometri<br>l-base t<br>trochen<br>a cells,<br>cs- work<br>c growth<br>ccific ex | 10       2     , app       pory – sa       tahedra       poric       10       ctrode       ems, condition       ctitration       nical set       Fuel condition       king of the       10       n polym       kingles | licatic<br>lient f<br>l com<br>olecule<br>Hrs<br>and<br>ncept<br>ions (i<br>s), ph<br>nsors<br>ells, h<br>the ba<br>Hrs<br>erizat<br>and<br>s of - | glass<br>of p<br>redo<br>notov<br>- po<br>ttteri | to hyu<br>ares –<br>tes, m<br>energy<br>ess ele<br>bH, pH<br>ox titra<br>voltaic<br>ogen-o<br>ies ino<br>coord<br>chani<br>akelite | irogen,<br>energy<br>agnetic<br>gy level<br>:ctrode)<br>I meter<br>ations),<br>c cell –<br>ometric<br>oxygen,<br>cluding<br>ination<br>sms of |
| formalde<br>Conducti   | hyde, N  | ylon-66<br>mers –   | , carbor   | n fibres,<br>tvlene   | , Elastor<br>polvanil   | mers-B   | una-S, I<br>vovrrole   | Buna-N  | -prepar   | ation, p   | propertion   | es and   | l app  | plicati  | ons.  |
| UNIT –   | IV   | I   | nstrum <sup>,</sup>  | ental M   | lethods   | and A  | pplicati   | ons   | citatiion   | 1 01 0011  | 10   | Hrs  | <sup>1</sup> ppn                                 | icatio   |   |
| Beer-Lan<br>Colorome   | nbert's l<br>etry, AA<br>lethods   | aw,, Pr<br>S, AES<br>for sep  | inciple<br>3, Instru   | and ap<br>umentat   | plication<br>tion ,Pr   | ns of U<br>inciples  | V-Visibles and a   | le spec <sup>.</sup><br>applica   | trophoto<br>tions of  | ometer,<br>E Chron   | Princip<br>natograj  | le and<br>phic t   | d ap<br>echr                                     | oplicat<br>niques  | ions of<br>s(GC &   |
| $\frac{11 \text{ Deg}}{\text{UNIT}} - \frac{1}{2}$   | V  |   | Vater Te   | echnolo   | ogy   | tures a  | nu nqui  |   | 105.  |  | 10   | Hrs  |  |  |   |
| ntroduct   | tion –Sc   | oft Wate  | er and l   | hardnes   | ss of wa  | ater, Es   | timation   | n of ha   | rdness  | by ED1   | A Meth   | od -   | Boil   | er tro   | ubles -   |
| scale and<br>and Wor<br>water, re<br><b>Textbo</b>   | l sludge<br>ld healt<br>verse os<br><b>oks:</b>  | , Indus<br>h orgar<br>mosis (   | trial wa<br>iization<br>RO) and  | ter trea<br>(WHO)<br>1 electro  | tment –<br>standar<br>odialysis   | specifi<br>ds, zeo<br>s.   | cations :<br>lite and  | for drin<br>ion-ex  | king wa<br>change   | ater, Bu<br>process  | reau of<br>ses - de  | India:<br>salina   | n Sta<br>ation                                   | andar<br>1 of bi   | ds(BIS)<br>rackish  |
| 1. Jai<br>2. Pet<br>20<br>3. En<br>edu   | in and J<br>ter Atkin<br>10.<br>gineerir<br>ucation(   | ain, En<br>1s, Juli<br>1g Cher<br>India) F  | gineerir<br>o de Pau<br>nistry 1<br>Private I  | ng Cher<br>ula and<br>by G V<br>Limited.  | nistry, 1<br>James<br>Subba   | l6/e, Di<br>Keeler,<br>Reddy   | hanpat i<br>Atkins'<br>7, K N s  | Rai, 20<br>Physic<br>Jayave   | 13.<br>al Cher<br>era and   | nistry, 1<br>C Rai   | l0/e, O:<br>nachan   | xford<br>draial  | Univ<br>n, M                                     | versity<br>Ic Gra  | <sup>,</sup> Press,<br>aw Hill  |
| 1. J.<br>2. Sl<br>3. Bo<br>4. W  | D. Lee,<br>koog an<br>en L. Fe<br>ïllard M   | Concis<br>d West,<br>ringa a<br>erritt D  | e Inorga<br>Princip<br>nd Wesl<br>Dean Set   | anic Ch<br>les of Ir<br>ley R. B<br>ttle, 7 th  | emistry<br>nstrume<br>rowne,<br>n Edition   | , 5/e, C<br>ental An<br>Molecul<br>n Instru  | Oxford U<br>aalysis, (<br>lar Swite<br>amental   | niversit<br>5/e, Th<br>ches, 2<br>methoo  | y Press<br>omson,<br>/e, Wile<br>1s for ai  | , 2008.<br>2007.<br>y-VCH,<br>nalysis  | 2011.  |  |  |  |   |
| lapping o  | f course   | outcom  | es with  | progran   | n outcom  | nes  | <b>P07</b>   | DOS   | DOO   | PO10   | PO11   | DO 1   | <u>,                                     </u>    | DGO1   | BEOG  |
| 001  | 201  | P02   | PU3  | P04   | P05   | P06  | PU7  | P08   | 409   | P010   | PUII   | POI  |  | r901   | P502  |
| C01  | 3  |   |  |   | -   |  |  |   |   |  |  |  |  |  | <b> </b>  |
| CO2  | 3  |   |  |   | 2   |  |  |   |   |  |  |  |  |  | <b> </b>  |
| CO3  | 3  |   | 2  |   |   |  |  |   |   |  |  |  |  |  | <b> </b>  |
| CO4  | 3  |   |  |   | 3   |  |  |   |   |  |  |  |  |  | ļ]  |
| CO5  | 3  |   | 2  |   |   |  |  |   |   |  |  |  |  |  |   |

| Cours                    | se Code          | ;                 |                   |           | Da        | ahahilit  | And G     | Statisti  |                      |           | L                          | Т                 | Ρ     |               | С         |
|--------------------------|------------------|-------------------|-------------------|-----------|-----------|-----------|-----------|-----------|----------------------|-----------|----------------------------|-------------------|-------|---------------|-----------|
| 20AF                     | 3S9911           |                   |                   |           | PIC       | obabilit  | y Ana a   | Statisti  | CS                   |           | 3                          | 0                 | 0     |               | 3         |
| Pre-re                   | equisite         | e Pr              | obabili           | ty        |           |           |           |           | Sei                  | mester    |                            |                   | I -   | II            |           |
| Course C                 | Outcom           | es (CO)           | :                 |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| CO                       | 1: Inter         | pret the          | e chara           | cteristic | s throu   | gh corre  | elation a | and reg   | ression              | tools.    |                            |                   |       |               |           |
| CO                       | <b>2:</b> Mak    | e use of          | the co            | ncepts o  | of proba  | bility ar | nd their  | applica   | tions.               |           |                            |                   |       |               |           |
| CO                       | 3:Apply          | v discre          | te and o          | continuo  | ous pro   | bability  | distribu  | itions.   |                      |           |                            |                   |       |               |           |
| CO                       | <b>4:</b> Infer  | ence th           | e comp            | onents    | of a clas | ssical hy | ypothes   | is test f | or large             | sample    |                            |                   |       |               |           |
| CO                       | <b>5:</b> Insp   | ect the           | compor            | ients of  | a classi  | ical hyp  | othesis   | test for  | small s              | amples.   |                            |                   |       |               |           |
| UNIT – I                 |                  |                   |                   |           |           |           |           |           |                      |           | 10 1                       | Hrs               |       |               |           |
| Descriptiv               | ve stati         | stics a           | nd met            | hads fa   | r data (  | science   |           |           |                      |           | _                          | -                 |       |               |           |
| Data scier               | ice, Sta         | tistics I         | ntroduo           | ction, Pe | opulatio  | on vs Sa  | ample, (  |           | on of da             | ta, prim  | ary an                     | d seco<br>Jalizat | ndai  | ry da<br>Meas | ta, Type  |
| Central te               | endency          | 7, Meas           | sures o           | of Varia  | bility (  | spread    | or var    | iance)    | Skewne               | ess Kur   | tosis, c                   | correla           | tion, | , cor         | relation  |
| coefficient              | , rank c         | orrelati          | ion, reg          | ression   | coeffici  | ents, pr  | inciple   | of least  | square               | s, metho  | od of le                   | ast sq            | uare  | s, reg        | gression  |
| lines                    |                  |                   |                   |           |           |           |           |           |                      |           | _                          |                   |       |               |           |
| UNIT – II                | [                |                   |                   |           |           |           |           |           |                      |           | 8 H                        | rs                |       |               |           |
| Probabili                | ty               |                   |                   |           |           |           |           |           |                      |           |                            |                   |       |               | - ·       |
| Probability              | y, prot          | oability          | axioms            | , additi  | on law a  | and mu    | ltiplicat | ive law   | of prob              | ability,  | condition of the condition | onal p            | roba  | bility        | , Baye's  |
| expectatio               | n.               | i variat          | nes (ui           | SCIELE 8  | ulu col   | muou      | s, prou   | ability   | density              | iuncuc    | ms, pr                     | operu             | -5, 1 | nauit         | matical   |
| UNIT – II                | (I               |                   |                   |           |           |           |           |           |                      |           | 8 H                        | rs                |       |               |           |
| Probabili                | ty disti         | ributior          | 15                |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| Probability              | y distrib        | oution -          | Binom             | ial, Poi  | isson a   | pproxin   | nation    | to the b  | inomial              | distribu  | ution a                    | nd noi            | mal   | distr         | ibution-  |
| their prop               | erties.          |                   |                   |           |           |           |           |           | · · · ·              |           |                            |                   |       |               |           |
| UNIT – I                 | V                |                   |                   |           |           |           |           |           |                      |           | 8 H                        | rs                |       |               |           |
| Estimatio                | on and           | Testing           | g of hyj          | othesi    | s, large  | sample    | e tests   |           |                      |           |                            | c                 | 11    | 1             |           |
| Estimation               | n-paran          | leters,           | statisti          | cs, san   | apling    | distribu  | ition, p  | ount es   | stimatio             | n, Fori   | nulatio                    | n oi<br>of err    | null  | nyp           | othesis,  |
| the test.                | Large S          | Sample            | Tests:            | Test for  | r single  | e propo   | rtion, d  | lifferenc | ce of pi             | coportion | ns, test                   | t for             | singl | e me          | an and    |
| difference               | of mean          | ns. Con           | fidence           | interval  | for par   | ameters   | s in one  | sample    | and tw               | vo sampl  | le probl                   | ems               | 0     |               |           |
| UNIT – V                 |                  |                   |                   |           |           |           |           |           |                      |           | 8 H                        | rs                |       |               |           |
| Small sar                | mple te          | sts               |                   |           |           |           |           |           |                      |           | -                          |                   |       |               |           |
| Student t-               | distribu         | ution (te         | est for s         | ingle m   | ean, t    | wo mea    | ns and j  | paired t  | test), t             | esting o  | f equal                    | ity of v          | varia | nces          | (F-test), |
| x2 - test ic<br>Textbook | or goodi<br>s:   | ness of 1         | 11 <b>t</b> .     |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| 1 M                      | illor on         | 1 Froun           | do Droi           | bobility  | and Sta   | tistics   | for Fra   | noora 7   | /o Boo               | raan 20   | 08                         |                   |       |               |           |
| 1. M                     | C Gun            | to and V          | US, PIO           | bability  | and Sta   | ntols of  | Mother    | netical   | /e, real<br>Statisti | 15011, 20 | Sultor                     | h Char            | ad &  | Son           |           |
| 2. 5.<br>Pi              | ublicatio        | $ns 20^{\circ}$   | v.K. Kaj<br>12    | , i t     | inuanie   | intais of | Mattici   | liatical  | Statistic            | .5, 11/0  | , Sultai                   |                   | iu œ  | 5011          | 5         |
|                          |                  | , 20              |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| Reierence                | BOOKS            |                   |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| 1. S.<br>Di              | Chand<br>r.M.V.S | ,Proba<br>S.N. Pr | bility ar<br>asad | id Statis | stics, Di | r.T.K.V.  | lyengai   | r, Dr.B.  | Krishna              | a Gandh   | ii, S. Ra                  | ingana            | athai | m,            |           |
| 2. S.                    | Ross. a          | a First C         | Course i          | n Proba   | bility. I | Pearson   | Educat    | ion Indi  | ia. 2002             | 2.        |                            |                   |       |               |           |
| 3. W                     | . Feller,        | an Intr           | oductio           | on to Pro | babilit   | y Theory  | y and its | s Applic  | ations,              | 1/e, Wi   | ley, 196                   | 58.               |       |               |           |
| Online L                 | earning          | g Resou           | irces:            |           |           | <u> </u>  |           |           | -                    |           | 0.                         |                   |       |               |           |
| www.nptel                | l.ac.in          |                   |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
|                          |                  |                   |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| Mapping of               |                  | PO2               | PO2               | progran   |           | nes       | P07       | PUs       | POQ                  | PO10      | PO11                       | P010              | о р   | SO1           | PSO2      |
| 6.01                     |                  | 104               | 103               | 104       | 103       | 100       | 107       | 1.09      | 109                  | 1010      | 1011                       | 1012              |       | 551           | 1 502     |
| C01                      | 3                |                   |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| C02                      |                  | 2                 |                   |           |           | ļ         |           |           |                      |           |                            |                   |       |               |           |
| CO3                      |                  | 2                 |                   |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| CO4                      |                  |                   | 3                 |           |           |           |           |           |                      |           |                            |                   |       |               |           |
| CO5                      |                  |                   | 3                 |           |           |           |           |           |                      |           |                            |                   |       |               |           |

 CO5
 3

 (Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

| Cour  | 1  |   |   |   |  |   |  |   |  |  | -   | _   | _  |   |  |
|---|--|---|---|---|--|---|--|---|--|--|---|---|--|---|--|
| 00 ^ 1  | se Code  | *   |   | Informa   | ation T  | echnolo   | ogy And  | Nume  | rical Mo   | ethods   | L   | T   | P  | C   |  |
| 20AI  | ES0505   |   |   |   |  |   |  |   | -  |  | 3   | 0   | 0  | 3   |  |
| Pre-re  | equisite   |   | Basic Co  | mputer  | Knowl  | edge  |  |   | Semes  | ster   |   |   | I - II   |   |  |
| <b>CO1:</b> Us<br><b>CO2:</b> Ez<br><b>CO3:</b> Pe  | sage of I<br>xplain the  | Digital<br>ne nee<br>1 devic  | World a:<br>ds of har   | nd Expl<br>dware a  | oring C<br>and soft  | yber spa<br>ware re   | ace<br>quired fo   | or a cor  | nputatio   | on task.   |   |   |  |   |  |
|   | Inplicia   |   |   |   |  |   | neepto   |   |  |  | QU  | *0  |  |   |  |
| INTROD  | UCTION   | N TO  | INFORM  | ATION   | TECHN  | NOLOGY  | Y Your   | Digital   | World:   | The Pr   | actical   | User:   | How  | Becomi  | ng   |
| Compute<br>Cell pho<br>Understa<br>Technolo<br><b>THE INT</b><br>Broadba<br>Commur<br>the Soci  | er Savvy<br>ones, Er<br>anding<br>ogy Head<br><b>FERNET</b><br>nd, & A<br>nicating<br>ial Web  | v Bene<br>mail, t<br>Your<br>ded?<br><b>&amp; TH</b><br>Access<br>over t<br>, The   | fits You,<br>he Inter<br>Compute<br><b>IE WOR</b><br>Provider<br>he Net, T<br>Intrusiv  | Inform<br>rnet, &<br>er: How<br>LD WID<br>rs, How<br>The Onli<br>ve Inter   | ation T<br>the E-<br>Can Y<br>De WEB<br>Does t<br>ine Gold<br>met: Su  | echnolo<br>World,<br>You Cus<br><b>Explor</b><br>the Inte:<br>d Mine:<br>nooping  | ogy & Yo<br>The "Al<br>stomize<br>ring Cyl<br>rnet Wo<br>Telepho:<br>5, Spam:  | our Life<br>I-Purpo<br>(or Bu<br>berspac<br>rk? Tho<br>ny, Mui<br>ming, S   | : The Fi<br>ose Mac<br>ild) You<br><b>:e:</b> Conn<br>e World<br>ltimedia<br>Spoofing                                    | uture No<br>hine": 7<br>ar Own<br>necting<br>Wide V<br>, Webca<br>g, Phish                                     | ow, Inf<br>The Va<br>PC?,<br>to the<br>Veb, En<br>sting, I<br>ning, F   | otech<br>arieties<br>Where<br>Interne<br>mail &<br>Blogs,<br>Pharmi                                 | Is All i<br>of Co<br>Is In<br>et: Nai<br>Othe<br>E-Con<br>ng, Co                                   | Pervasi<br>ompute<br>formati<br>rowban<br>rowban<br>rowban<br>rowban<br>soban<br>ookies,      | ve:<br>rs,<br>on<br>nd,<br>of<br>, &<br>&                                  |
| Spyware   | T  | <u> </u>  |   |   |  |   |  |   |  |  | 0 1   | *0  |  |   |  |
| SOFTWA<br>System<br>Device I<br>Applicati<br>HARDWA<br>STORAG   | ARE To<br>Softwar<br>Drivers<br>ion Softwar<br>ARE: TH<br>E: HOW   | ols for<br>re: The<br>& Uti<br>ware: (<br>HE CP<br>V TO (   | r <b>Produc</b><br>e Power<br>lity Prog<br>Getting S<br>U & STO<br>CHOOSE   | <b>ctivity</b><br>Behind<br>grams, (<br>Started,<br>RAGE I<br>A MUI   | & Crea<br>the Pow<br>Commo<br>Word P<br>How to<br>LTIMED   | tivity:<br>ver, The<br>n Featu<br>rocessir<br>Choose<br>DA COM  | SOFTWA<br>e Operat<br>ares of<br>ng, Sprea<br>a Multin<br>MPUTER   | ARE: To<br>ing Sys<br>the Us<br>adsheet<br>media (<br>SYSTE   | OOLS F<br>stem: W<br>er Inter<br>s, Data<br>Compute<br>M, Mic  | OR PRO<br>hat It D<br>rface, C<br>base Soi<br>er Syste<br>rochips,   | DDUCT<br>oes? O<br>common<br>ftware,<br>m: HAI<br>Minia   | IVITY<br>ther S<br>n Ope<br>Specia<br>RDWA<br>turizat   | & CRI<br>ystem<br>rating<br>Ilty So<br>RE: TH<br>ion, &  | EATIVI<br>Softwa<br>Systen<br>ftware<br>IE CPU<br>Mobili                                      | FY,<br>re:<br>ns,<br>&<br>ty,  |
| the Syste<br>& Storag   | em Unit<br>ge  | : The   | Basics, I   | More on   | the Sy   | stem Uı   | nit, Secc  | ondary  | Storage  | , Future   | Develo  | opmen   | ts in F  | rocessi   | ng   |
| UNIT – I  | II   |   |   |   |  |   |  |   |  |  | 8 H   | rs  |  |   |  |
| COMMU<br>Digital A<br>& Safegu  | NICATI<br>ge, Netv<br>aards<br>f course  | ONS,<br>vorks,<br>outco   | Wired C   | RKS, & ommun  | SAFEC  | GUARDS<br>s Media<br>mes  | S The V<br>, Wireles   | Wired &<br>ss Com   | Wirel<br>municat   | <b>ess Wo</b> r<br>tions Me  | <b>rld:</b> Freedrich Freedrich Freedrich (1997)<br>Freedrich (19 | om the<br>ber Th  | e Anal<br>nreats,  | og to 1<br>Hacke  | the<br>rs,   |
|   |  |   | mes with  |   |  |   |  |   |  |  |   |   |  |   |  |
|   | PO1  | PO2   | PO3   | PO4   | PO5  | P06   | PO7  | PO8   | PO9  | PO10   | PO11  | PO12  | PSC  | 1 PS  | 02   |
| CO1   | PO1<br>3   | PO2<br>2  | PO3   | PO4   | P05<br>2   | PO6   | PO7  | PO8   | PO9  | PO10   | PO11  | PO12  | PSC<br>2   | 1 PS  | 02   |
| C01<br>C02  | PO1<br>3<br>3  | PO2<br>2<br>3   | PO3<br>2  | PO4   | P05<br>2   | PO6   | P07  | PO8   | PO9<br>2   | P010   | PO11  | PO12<br>2<br>2  | PS0<br>2<br>2  | 1 PS  | 02   |
| CO1<br>CO2<br>CO3   | PO1 3 3 3 3  | PO2<br>2<br>3<br>2  | PO3<br>2  | PO4   | P05<br>2<br>2  | PO6   | PO7  | PO8   | PO9<br>2   | P010   | P011  | P012<br>2<br>2<br>2   | PS0<br>2<br>2  | 1 PS  | 02   |
| CO1<br>CO2<br>CO3<br>evels of (   | PO1<br>3<br>3<br>3<br>Correlat   | PO2<br>2<br>3<br>2<br>ion, vi   | PO3 2 2 2., 1-Low   | PO4   | P05 2 2 2 erate, 3   | PO6   | P07  | PO8   | P09<br>2   | P010   | P011  | PO12<br>2<br>2<br>2   | PS0<br>2<br>2  | 1 PS  | 02   |
| CO1<br>CO2<br>CO3<br>Levels of 0<br>COAES05   | PO1 3 3 3 Correlat: 05 site  | PO2<br>2<br>3<br>2<br>ion, vi   | PO3<br>2<br>z., 1-Low   | PO4   | PO5 2 2 erate, 3 Nu  | PO6<br>High)<br>merical   | PO7  | PO8   | P09<br>2   | P010   | P011  | PO12<br>2<br>2<br>2   | PSC<br>2<br>2  | 1 PS0   | 02   |
| CO1<br>CO2<br>CO3<br>Levels of<br>'re-requi<br>vurse Ou<br>CO<br>pro<br>CO<br>me  | PO1<br>3<br>3<br>Correlat:<br>05<br>site<br>tcomes<br>04: Ana<br>oblems<br>05: Anal<br>ethods  | PO2 2 3 2 ion, vi E iv lyze ti  | PO3<br>2<br>z., 1-Low<br>Basic Sta<br>he conce  | PO4<br>, 2-Mode   | PO5 2 2 erate, 3 Errors, g the co  | PO6<br>High)<br>merical   | PO7<br>Method  | PO8<br>ds<br>Transce<br>numeric   | PO9<br>2<br>endental   | P010   | PO11  | PO12<br>2<br>2<br>2<br>2<br>2<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | PSO<br>2<br>2<br>differ<br>attegrat  | 1 PS(   | nume   |
| CO1<br>CO2<br>CO3<br>Levels of<br>Pre-requi<br>Durse Ou<br>CO<br>pro<br>CO<br>me<br>CO  | PO1<br>3<br>3<br>Correlat:<br>05<br>site<br>tcomes<br>94: Ana<br>oblems<br>95: Anal<br>ethods<br>6: Apple  | PO2 2 3 2 ion, vis Iyze ti yze In y the o   | PO3 PO3 2 z., 1-Low, Basic Sta he conce terpolation   | PO4<br>, 2-Mode<br>epts of<br>on usin<br>of O.D   | PO5 2 2 erate, 3 Errors, g the co E on nu  | PO6<br>High)<br>merical<br>, Algebr<br>oncepts<br>umerical  | PO7<br>Method  | PO8<br>ds<br>Transce<br>numeric   | PO9<br>2<br>endental   | P010   | P011  | PO12<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | PSO<br>2<br>2<br>differ  | 1 PS  | nginee   |
| CO1<br>CO2<br>CO3<br>Levels of<br>Pre-requi<br>Durse Ou<br>CO<br>pro<br>CO<br>me<br>CO<br>UNIT – I<br>Trors in  | PO1<br>3<br>3<br>Correlat:<br>05<br>site<br>tcomes<br>04: Ana<br>oblems<br>05: Anal<br>ethods<br>06: Appl<br>Numeric   | PO2 2 3 2 ion, vi E ityze ti yze In y the c cal co  | PO3<br>PO3<br>2<br>z., 1-Low<br>basic Sta<br>he conce<br>terpolation<br>concepts<br>mputati   | PO4<br>, 2-Mode<br>epts of<br>on usin<br>of O.D   | PO5<br>2<br>2<br>erate, 3<br>Errors,<br>g the co<br>E on nu  | PO6<br>High)<br>merical<br>Algebri<br>oncepts<br>americal   | PO7<br>PO7<br>Method<br>raic & 7<br>of the r<br>1 method   | PO8<br>ds<br>Transce<br>numeric<br>1<br>cv, Mat   | PO9<br>2<br>endental<br>cal meth   | P010   | PO11  | PO12<br>2<br>2<br>2<br>solve  | PSO<br>2<br>2<br>differ<br>ategrat   | 1 PS  | nginee   |
| CO1<br>CO2<br>CO3<br>Levels of<br>Pre-requi<br>ourse Ou<br>CO<br>pro<br>CO<br>me<br>CO<br>UNIT – I<br>Frors in D<br>posolute, F<br>olution o<br>uphson M<br>ethod.  | PO1<br>3<br>3<br>Correlat:<br>05<br>site<br>tcomes<br>05: Anal<br>oblems<br>05: Anal<br>ethods<br>06: Appl<br>Numeric<br>Relative a<br>of Algeb<br>Method,           | PO2 2 3 2 ion, vis PO2 Final Content of the second | PO3<br>PO3<br>2<br>z., 1-Low,<br>Basic Sta<br>he conce<br>terpolation<br>concepts<br>mputation<br>ercentage<br>nd Tran<br>on of lin   | PO4<br>PO4<br>, 2-Mode<br>epts of<br>on usin,<br>of O.D.:<br>ions: Er<br>e Errors<br>scende:<br>near sim  | PO5<br>2<br>2<br>erate, 3<br>Errors,<br>g the co<br>E on nu<br>trors and<br>trors and<br>trors and<br>trors and<br>trate of<br>the co  | PO6<br>High)<br>merical<br>oncepts<br>americal<br>ad their<br>eral error<br><b>juations</b><br>ous equ  | PO7<br>PO7<br>Method<br>raic & 7<br>of the r<br>l method<br>or formu<br>s: The E<br>action: C  | PO8<br>ds<br>fransce<br>numeric<br>l<br>cy, Mat<br>la, Erro<br>Bisection<br>Crout's                                 | PO9<br>2<br>endental<br>cal meth<br>hematic<br>or in a s<br>n Metho<br>triangu   | P010<br>P010<br>Equation<br>Prelimeries ap<br>od – The<br>larisatio  | P011<br>P011<br>I-I<br>ions to<br>1 apply<br>8 F<br>minarie<br>proxim<br>e Metho<br>n meth  | PO12<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2      | PSO<br>2<br>2<br>differ<br>ategrat   | 1 PS  | D2<br>nginee<br>nume<br>Anal<br>- Nev<br>1 itera                           |
| CO1<br>CO2<br>CO3<br>Levels of CO<br>Pre-requi<br>Durse Ou<br>CO<br>pro<br>CO<br>DUNIT – I<br>Frors in D<br>Dosolute, F<br>Dolution o<br>aphson M<br>ethod.   | PO1 3 3 Correlat: 05 site tcomes 94: Ana oblems 95: Anal ethods 96: Apple Numeric Relative of Algeb Algeb Algeb Algeb  | PO2 2 3 2 ion, vi E iv lyze ti lyze ti lyze In cal co and Pe raic a Soluti  | PO3<br>PO3<br>2<br>z., 1-Low<br>Basic Sta<br>he conce<br>terpolation<br>concepts<br>mputati<br>ercentage<br>nd Tran<br>on of lin  | PO4<br>PO4<br>atistics<br>epts of<br>on usin<br>of O.D<br>ions: Er<br>e Errors<br>scender<br>hear sim   | PO5<br>2<br>2<br>erate, 3<br>Errors,<br>g the co<br>E on nu<br>crors an<br>, A gene<br>nultane   | PO6<br>High)<br>merical<br>oncepts<br>umerical<br>ad their<br>eral error<br><b>juations</b><br>ous equ  | PO7<br>PO7<br>Method<br>raic & 7<br>of the r<br>l method<br>Accurac<br>or formu<br>s: The E<br>nation: C   | PO8<br>ds<br>Transce<br>numeric<br>d<br>cy, Mat<br>la, Erro<br>Bisection<br>Crout's                                 | PO9<br>2<br>endental<br>cal methor<br>in a s<br>n Methor<br>triangu  | P010<br>P010<br>Equation<br>Eal Prelineries ap<br>od – The<br>larisatio  | P011  P011  I-I  ions to apply  8 I  minarie proxim e Metho n meth 8 I  | PO12<br>2<br>2<br>2<br>2<br>3<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | PSO<br>2<br>2<br>differ<br>ategrat   | 1 PS  | D2   |
| CO1<br>CO2<br>CO3<br>Levels of (<br>OAESO5<br>Tre-requi<br>ourse Ou<br>CO<br>pro<br>CO<br>pro<br>CO<br>me<br>CO<br>NIT – I<br>rors in D<br>solute, F<br>lution o<br>phson M<br>ethod.<br><u>NIT – II</u><br>terpolati<br>ckward f<br>urve fitt:<br>uares. N | PO1 3 3 3 Correlat: 05 site tcomes 94: Ana oblems 95: Anal oblems 95: Anal ethods 96: Appl Numeric Relative of Algeb Method, ion: Ne formula, ing: Fit Numeric       | PO2 2 3 2 ion, vi F i lyze ti yze In y the c cal co and Pe raic a Soluti wwton's , Stirlin ting o al Dif  | PO3<br>PO3<br>2<br>z., 1-Low,<br>basic Sta<br>he conce<br>terpolation<br>concepts<br>mputati<br>ercentage<br>nd Tran<br>on of lim<br>a forward<br>ng's form<br>f a strai<br>ferentiat                 | PO4<br>PO4<br>, 2-Mode<br>epts of<br>on usin<br>of O.D<br>ions: Er<br>e Errors<br>scender<br>hear sim<br>d and<br>nula, Ber<br>ight line<br>ion for             | PO5 2 2 erate, 3 Errors, g the co E on nu trors an , A gene nultanee backwa ssel's fo e – Sec Newto  | PO6<br>High)<br>merical<br>oncepts<br>americal<br>ad their<br>eral error<br>putions<br>ous equi-<br>ard inter<br>ormula.<br>cond de<br>n's in | PO7<br>PO7<br>Method<br>raic & 7<br>of the r<br>l method<br>Accurate<br>or formu<br>s: The E<br>lation: C<br>erpolation<br>gree cun<br>atterpolat            | PO8<br>ds<br>Transce<br>numeric<br>l<br>cy, Mat<br>la, Erro<br>Bisection<br>Crout's<br>n form<br>rve – E<br>ion for | PO9<br>2<br>endental<br>cal meth<br>hematic<br>or in a s<br>n Metho<br>triangu<br>ulae –<br>xponen<br>mula.              | P010<br>P010   | P011<br>P011<br>I-I<br>ions to<br>1 apply<br>8 F<br>minarie<br>proxim<br>e Metho<br>n method<br>ge's for<br>ve-Pow<br>cal Into  | PO12<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2<br>2      | PSO<br>2<br>2<br>2<br>differ<br>ategrat<br>cors an<br>calse P<br>auss<br>c. Gau<br>ve by<br>n: Tra | 1 PS  | D2<br>nginee<br>nume<br>Anal<br>- Nev<br>l itera<br>ward<br>d of<br>al ru  |
| CO1<br>CO2<br>CO3<br>Levels of<br>20AESO5<br>Pre-requi<br>ourse Ou<br>CO<br>pro<br>CO<br>me<br>CO<br>UNIT – I<br>frors in I<br>posolute, F<br>olution o<br>aphson M<br>ethod.<br>UNIT – II<br>terpolati<br>ackward f<br>arve fitt:<br>juares. M             | PO1 3 3 3 Correlat: 05 site tcomes 94: Ana oblems 95: Anal ethods 05: Anal ethods 06: Appl Numeric Relative f Algeb Algeb Algeb Internation Ing: Fit Numeric 1/3 Rul | PO2 2 3 2 ion, vi: pyze In y the o cal co and Pe raic a Soluti wton's , Stirlin ting o al Dif le – Sin  | PO3<br>PO3<br>2<br>z., 1-Low,<br>basic Sta<br>he conce<br>terpolation<br>concepts<br>mputation<br>ercentage<br>nd Tran<br>on of lim<br>a forward<br>ng's form<br>f a strait<br>ferentiat<br>mpson's d | PO4<br>PO4<br>, 2-Mode<br>epts of<br>on usin<br>of O.D<br>ion s: Er<br>e Errors<br>scende:<br>hear sim<br>d and<br>nula, Be:<br>ight line<br>ion for<br>3/8 Rul | PO5 2 2 Prate, 3 2 Profile 2 2 Prate, 3 2 Profile 2 Prof | PO6<br>High)<br>merical<br>oncepts<br>umerical<br>ad their<br>eral error<br><b>puations</b><br>ous equi                                       | PO7<br>PO7<br>Method<br>raic & 7<br>of the r<br>1 method<br>of the r<br>1 method<br>or formu<br>s: The E<br>nation: C<br>erpolation<br>gree cun<br>tterpolat | PO8<br>ds<br>Transce<br>numeric<br>d<br>cy, Mat<br>la, Erro<br>Bisection<br>Crout's<br>n form<br>rve – E<br>ion for | PO9<br>2<br>endental<br>cal meth<br>cal meth<br>bematic<br>or in a s<br>n Metho<br>triangu<br>ulae –<br>cxponen<br>mula. | P010<br>P010<br>Equation<br>Pods and<br>Prelineries appod – The<br>larisation<br>Lagran<br>tial cur<br>Numerio | P011  | PO12<br>2<br>2<br>2<br>2<br>3<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5<br>5 | PSO<br>2<br>2<br>differ<br>ategrat<br>ors an<br>alse P<br>auss<br>c. Gau<br>ve by<br>n: Tra        | 1 PSO<br>Pent Er<br>ion in :<br>d their<br>osition-<br>· Seida<br>uss for<br>metho<br>apezoid | D2<br>Ingined<br>nume<br>Anal<br>- Nev<br>l itera<br>ward<br>d of<br>al ru |

**Numerical solution of Ordinary Differential equations:** Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method- Runge - Kutta Methods. Numerical solutions of Laplace equation using finite difference approximation. Initial Value Problem, Eigen Value Problem and Boundary-value Problem

### **Textbooks:**

- 1. Using Information Technology 9th Edition By Brian Williams and Stacey Sawyer, Mcgraw Hill Publications
- 2. "Computer Oriented Numerical Methods" by V Rajaraman

### **Reference Books:**

- 1. Uttam K Roy, -Web Technologiesl, Oxford University Press, 1st Edition, 2010.
- 2. HTML and CSS: Design and Build Websites 1st Edition by Jon Duckett (Author) india price
- 3. Steven Holzner, -The Complete Reference PHPI, Tata McGraw-Hill, 1st Edition, 2007.
- 4. HTML & CSS: The Complete Reference, Fifth Edition (Complete Reference Series)
- 5. Deitel and Deitel and Nieto, --Internet and World Wide Web How to Program, Prentice Hall, 5 th Edition, 2011.
- 6. Numerical Methods by E Balaguruswamy

### **Online Learning Resources:**

- 1. http://www.scoopworld.in
- 2. http://www.sxecw.edu.in
- 3. http://www.technofest2u.blogspot.com
- 4. http://www.ptutorial.com/php-example/php-upload-image
- 5. http://www.ptutorial.com/php-example/php-change-case
- 6. https://www.math.ust.hk/~machas/numerical-methods.pdf

### Mapping of course outcomes with program outcomes

|     | PO1 | PO2 | PO3 | PO4 | PO5 | P06 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO4 | 3   |     |     |     |     |     |     |     |     |      |      |      |      |      |
| CO5 | 3   |     |     |     |     |     |     |     |     |      |      |      |      |      |
| C06 | 3   |     |     |     |     |     |     |     |     |      |      |      |      |      |

| 20A   | rse Code   |  |   |  | Dete   | <b>0</b> 4   |  |  |  | L  | Т   | Р                                       |  | С                           |
|---|--|--|---|--|--|--|--|--|--|--|---|---|--|-----------------------------|
|   | ES0502   |  |   |  | Data   | Structi  | ires   |  |  | 3  | 0   | 0                                       |  | 3                           |
| Pre-1   | requisite  | С  | Program   | ming, N  | Mathematics  |  |  | Ser  | nester   |  |   | I -                                     | II   |                             |
| Course  | Objective  | es:  |   |  |  |  |  |  |  | •  |   |   |  |                             |
| • Tc  | teach th   | e repre  | esentation  | ı of solı  | ation to the pr  | oblem u  | ising al   | gorithm  |  |  |   |   |  |                             |
| • Tc  | explain t  | he app   | proach to   | algoritl   | hm analysis  |  |  |  |  |  |   |   |  |                             |
| • To  | ) introduc   | e diffe  | rent data   | structu  | ares for solving   | g the pr   | oblems   |  |  |  |   |   |  |                             |
| • 10<br>• Tc  | aemonst  | rate m   | visting be  | of the g   | iven problem a   | as a gra   | pn   |  |  |  |   |   |  |                             |
| • 10  | elucidad   | e uie e  | xisting na  | usining u  | teeninques   |  |  |  |  |  |   |   |  |                             |
| Course  | Outcome  | s (CO)   | :   |  |  |  |  |  |  |  |   |   |  |                             |
| C   | 01: Analy  | ze and   | l evaluate  | the eff  | iciency of an a  | algorithr  | n  |  |  |  |   |   |  |                             |
|   | 02: Imple  | ment I   | linear data   | a struct   | tures  |  |  |  |  |  |   |   |  |                             |
|   | 03: imple<br>04. Solve   | the pr   | oblem of  | efficien   | structures<br>thy using gran   | hs and   | Hashin   | y techni   | alles  |  |   |   |  |                             |
| C   | <b>05:</b> Imple   | ment a   | advanced  | sorting  | and organizi   | ng the fi  | le   | 5 teenin   | ques   | 1  |   |   |  |                             |
| UNIT - J  | I  |  |   | 0  | ,  | 0  | -  |  |  | 9 H  | rs  |   |  |                             |
| Introduc  | tion   |  |   |  |  |  |  |  |  |  |   |   |  |                             |
| Algorithm   | 1 Specifica  | ation, l   | Performar   | ice ana  | lysis, Perform   | ance Me  | easuren  | nent. Ar   | rays: Ai   | rays, D  | )ynam   | nical                                   | ly Allo  | ocated                      |
| Arrays. S   | tructures  | and U  | Jnions. So  | orting: N  | Motivation, Qu   | uick sort  | , how fa   | ast can  | we sort,   | Merge  | sort,   | Hea                                     | p sort   | :                           |
| UNIT – I  | II   |  |   |  |  |  |  |  |  | 9 H:   | rs  |   |  |                             |
| Stack, Q  | ueue and   | Linke  | d lists   |  |  |  |  |  |  |  |   |   |  |                             |
| Stacks, S   | tacks usi  | ng Dyr   | namic Arr   | ays, Qı  | ueues, Circula   | r Queue  | es Using   | g Dynar  | nic Arra   | ys, Eva  | luatio  | on of                                   | Expr   | essions,                    |
| Multiple S  | Stacks an  | d Que  | ues. Link   | ed lists   | : Singly Linke   | d Lists a  | and Cha  | ains, Re   | present  | ing Cha  | ains ir   | ı C,                                    | Linke  | d                           |
| Stacks ar   | nd Queue   | s, Addi  | itional Lis   | st Opera   | ations, Doubl  | y Linkeo   | d Lists.   |  |  |  |   |   |  |                             |
| UNIT – I  | 111  |  |   |  |  |  |  |  |  | 9 H:   | rs  |   |  |                             |
| Trees   |  |  |   |  |  |  |  |  |  |  |   |   |  |                             |
| Introduct   | tion, Bina   | ry Tree  | es, Binary  | Tree T   | raversals, Add   | litional   | Binary '   | Tree Op  | eration  | s, Binaı   | ry Sea  | ırch                                    | Trees  | ,                           |
| Lounting  | Binary I:  | rees, C  | optimal Bi  | inary se   | earch Trees, A   | VL Iree  | s. B-Ire   | ees: B-  | Irees, B   | + 1 ree  | s.  |   |  |                             |
| UNIT - J  | 1 V  |  |   |  |  |  |  |  |  | 0 11   | ra  |   |  |                             |
| <u> </u>  |  |  |   |  |  |  |  |  |  | 9 H:   | rs  |   |  |                             |
| Graphs a  | and Hash   | ing  | Trues El  | monto  | m. Croph Ope   | rationa  | Minima   | Im Coo   | t Spopp  | 9 Hi   | rs  | onto                                    | at Do  | the and                     |
| <b>Graphs</b> a<br>The Grap   | and Hash<br>h Abstrac  | <b>ing</b><br>t Data   | ı Type, Ele   | ementa   | ry Graph Ope   | rations,   | Minim  | um Cos   | t Spann  | 9 Hi   | rs<br>es, Sł  | norte                                   | est Pa   | ths and                     |
| <b>Graphs</b> a<br>The Grap<br>Transitive<br>Hashing:   | <b>and Hash</b><br>h Abstrac<br>e Closure<br>Introduct   | <b>ing</b><br>t Data   | t Type, Ele   | ementa<br>ple. Sta   | ry Graph Ope<br>tic Hashing, F   | rations,<br>)vnamic  | Minim  | um Cos   | t Spann  | 9 Hi   | rs<br>es, Sł  | norte                                   | est Pa   | ths and                     |
| <b>Graphs</b> a<br>The Grap<br>Transitive<br>Hashing:<br><b>UNIT – V</b>  | <b>and Hash</b><br>h Abstrac<br>e Closure<br>Introduct   | <b>ing</b><br>et Data  | a Type, Ele<br>Hash Tat   | ementa<br>ole, Sta   | ry Graph Ope<br>tic Hashing, I   | rations,<br>)ynamic  | Minim<br>Hashir  | um Cos<br>ng.  | t Spann  | 9 Hi<br>ing Tre  | rs<br>es, Sł<br>rs  | norte                                   | est Pa   | ths and                     |
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| Graphs a<br>The Grap<br>Transitive<br>Hashing:<br>UNIT – V<br>Files and<br>File Orga<br>Advanced<br>Textbook<br>1. E<br>S<br>2. A<br>Reference<br>1. D<br>2. P<br>3. R                              | and Hash<br>wh Abstrace<br>e Closure<br>Introduct<br>d Advanc<br>nization: S<br>l sorting:<br>xs:<br>Cillis Horow<br>Source, Pw<br>Man L. The<br>ce Books:<br>D. Samant<br>Peter Brass<br>Richard F.   | ing<br>it Data<br>ion to<br>ed sou<br>Sequen<br>Sorting<br>vitz an<br>t. Ltd.<br>arp, "F<br>a, "Cla<br>Gilber,   | Type, Ele<br>Hash Tab<br>rting<br>ntial File (<br>g on Seven<br>ad Sartaj S<br>, 2004.<br>File Organ<br>assic Data<br>anced Data<br>g, Behrou                           | ementa<br>ole, Sta<br>Organiz<br>ral keys<br>Sahni, '<br>ization<br>a Struct<br>ta Struct<br>z A.For                         | ry Graph Ope<br><u>tic Hashing, I</u><br>zation, Direct<br>s, List and Tal<br>"Fundamental<br>and Processin<br>tures", 2 <sup>nd</sup> Edi<br>ctures", Camb<br>rouzan, "Data | rations,<br>Dynamic<br>File Org<br>ble sorts<br>ls of Dat<br>ng", Wile<br>ition, Pro-<br>ridge Un<br>Structu             | Minimu<br>Hashir<br>anizatio<br>, Sumr<br>a Struc<br>ey and s<br>entice-H<br>niversity<br>res A P  | um Cosing.<br>on, Indenary of E<br>tures in<br>Sons, 19<br>Hall of In<br>y Press,<br>seudo c         | t Spann<br>xed Seq<br>Internal<br>n C", 2 <sup>nd</sup><br>988.<br>988.<br>988.<br>9016<br>ode App | 9 H:<br>ing Tre<br>9 H:<br>uential<br>sorting<br>Edition                         | rs<br>es, Sf<br>rs<br>File (<br><u>g, Ext</u><br>n, Ga<br>India<br>with ( | Drga<br>erna<br>Igotia<br>, 20          | est Pa<br>nizati<br>1 sort:<br>a Boo<br>12.<br>econd       | ths and<br>on.<br>ing.<br>k |
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| Graphs a<br>The Grap<br>Transitive<br>Hashing:<br>UNIT - V<br>Files and<br>File Orga<br>Advanced<br>Textbool<br>1. E<br>S<br>2. A<br>Reference<br>1. D<br>3. R<br>E<br>Online D<br>www.npte         | and Hash<br>sh Abstrace<br>e Closure<br>Introduct<br>d Advanc<br>nization: S<br>t sorting:<br>KS:<br>Cllis Horow<br>Source, Pw<br>dan L. The<br>Books:<br>D. Samant<br>Peter Brass<br>Richard F.<br>Odition, Ce<br>Learning<br>el.ac.in<br>of course c<br>P01  | ing<br>it Data<br>ion to<br>ed son<br>Sequen<br>Sorting<br>vitz an<br>t. Ltd.<br>arp, "H<br>a, "Cla<br>, "Adva<br>Gilber<br>engage<br>Resou<br>PO2             | A Type, Ele<br>Hash Tab<br>rting<br>ntial File (<br>g on Seve<br>d Sartaj S<br>, 2004.<br>File Organ<br>assic Data<br>anced Dat<br>g, Behrou<br>Learning<br>irces:      | ementa<br>ole, Sta<br>Organiz<br>ral keys<br>Sahni, '<br>ization<br>a Struct<br>ta Struct<br>z A.For<br>g 2005.              | ry Graph Ope<br>tic Hashing, I<br>zation, Direct 1<br>s, List and Tal<br>"Fundamental<br>and Processin<br>tures", 2 <sup>nd</sup> Edi<br>ctures", Camb<br>rouzan, "Data      | rations,<br>Dynamic<br>File Org<br>ble sorts<br>Is of Dat<br>Is of Dat<br>ition, Pro-<br>rridge Un<br>Structu            | Minimu<br>Hashir<br>anizatio<br>, Sumr<br>a Struc<br>ey and s<br>entice-H<br>niversity<br>res A P  | um Cosing.<br>on, Indenary of E<br>tures in<br>Sons, 19<br>Hall of In<br>y Press,<br>seudo c         | t Spann<br>xed Seq<br>Internal<br>C", 2 <sup>nd</sup><br>988.<br>988.<br>988.<br>9016<br>ode App   | 9 H:<br>ing Tre<br>9 H:<br>uential<br>sorting<br>Edition<br>t. Ltd.,<br>proach v | rs<br>rs<br>File (<br>g, Ext<br>n, Gai<br>India<br>with (                 | Drga<br>erna<br>Igotia<br>, 20<br>C", S | nizati<br>1 sort:<br>a Boo<br>12.<br>econd                 | ths and<br>on.<br>ing.<br>k |

|     | POI | P02 | P03 | P04 | P05 | P06 | P07 | P08 | P09 | P010 | POIL | P012 | PSOI | PS02 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C01 | 3   | 3   |     |     |     |     |     |     |     |      |      | 2    | 2    |      |
| CO2 | 3   | 2   | 2   |     | 2   |     |     |     |     |      |      | 1    | 2    | 1    |
| CO3 | 3   | 2   | 2   |     | 2   |     |     |     |     |      |      | 1    | 2    | 1    |
| CO4 | 3   | 2   | 2   | 2   |     |     |     |     |     |      |      | 1    | 2    | 2    |
| CO5 | 3   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 1    | 2    | 2    |

| <b>Course Code</b>                           |   |                              | L      | Т                | Р              | С             |
|--|---|------------------------------|--------|------------------|----------------|---------------|
| 20AES0509                                    | Python Programming  |                              | 1      | 0                | 4              | 3             |
| Pre-requisite                                | Problem Solving and Programming   | Semester                     |        |                  | I -            | п             |
| Course Outcomes (                            | CO):  |                              | 1      |                  |                |               |
| CO1: Unders<br>program                       | tand the Python syntax, semantics, basic program<br>ns                                    | nming construct              | s to b | e use            | d to v         | write the     |
| <b>CO2:</b> Utilize t<br><b>CO3:</b> Apply v | he methods of various data structures to manipu<br>arious packages to work with real need | late the data                |        |                  |                |               |
| CO4: Apply t                                 | he appropriate Object-Oriented Programming prin   | nciple for a given           | scen   | ario             |                |               |
| CO5: Develop                                 | bug free applications by handling different types   | s of exceptions              |        |                  |                |               |
| UNIT – I                                     |   |                              | 9 H    | rs               |                |               |
| asics of Python Pro                          | ogramming: Features and applications of Pythor  | n, Comparison w              | ith C, | Liter            | als, v         | variables and |
| onversion.                                   | s, comments, reserved words, indentation, ope   | iators, input ai             | iu Ot  | ուքու            | State          | ements, type  |
| • Write a progr                              | am to demonstrate different representations of n  | umbers in Pytho              | n.     |                  |                |               |
| Write a progr                                | am to perform different Operations on operators   | in Python                    |        |                  |                |               |
| JNIT – II                                    |   |                              | 9 H    | rs               |                |               |
| ecision Control Sta                          | atements: Introduction, selection/conditional brain                                       | anching statemer             | nts, b | asic l           | oop            |               |
| ructures/iterative s                         | tatements, nested loops, break, continue and pas  | ss statements, el            | se sta | teme             | nt us          | ed with       |
| ops.<br>t <b>rings:</b> operations a         | nd methods. Lists: accessing and undating value   | s in list nested a           | and cl | oninc            | r liete        | hasic list    |
| perations, list metho                        | ds. list comprehensions, looping in lists, Tuples.  | Sets. Dictionarie            | es and | l Ope            | ratio          | , basic list  |
| <ul> <li>Develop prog</li> </ul>             | rams to demonstrate decision making and looping   | g structures in p            | ython  | P-               |                |               |
| • Write a progr                              | am to create, append, and remove lists in Python  |                              |        |                  |                |               |
| • Write a progr                              | am to demonstrate working with tuples in pythor   | 1.                           |        |                  |                |               |
| Write a progr                                | am to demonstrate working with dictionaries in p  | ython.                       |        |                  |                |               |
| Case study on L                              | pops:   |                              |        |                  | _              |               |
| A perfect num                                | aber is a number for which the sum of its proper  | divisors is exact            | y equ  | al to            | the n          | umber. For    |
| example, the                                 | sum of the proper divisors of 28 would be $1 + 2 + 1 = 1 + 1 + 1 = 1 + 1 + 1 = 1 + 1 + 1$ | -4 + 7 + 14 = 28             | , whic | h me             | ans t          | hat 28 is a   |
| perfect numb                                 | er. A number n is called deficient if the sum of its                                      | s proper divisors            | 1s les | s tha            | nna            | nd it is      |
| called abuild                                | and it this sum exceeds it. While a program for the                                       | e given large n, n           | na m   | e sun<br>Print d | 1 01 a         | Il periect    |
| numbers alor                                 | if of all deficient numbers along with its  | sum and abund                | ant ni | imhe             | in per         | nect          |
| sum.   | is with its sum, denotent numbers along with its  | Sum and abund                |        | annoe            | io aic         | ing with its  |
| JNIT – III                                   |   |                              | 9 H    | rs               |                |               |
| unctions: Introduct                          | ion. Declaration and definition, calling a functi   | on. returning va             | lues   | from             | func           | tion, pass by |
| ject reference, argu                         | ments, Local and Global variables, recursive fund   | ctions, lambda fi            | inctio | ns, fr           | uitfu          | l functions.  |
| braries: NumPy, pa                           | ndas, Keras.  |                              |        |                  |                |               |
| Develop Pyth                                 | on programs using recursive and non-recursive f   | unctions                     |        |                  |                |               |
| • Write a prog                               | ram to demonstrate a) arrays b) array indexing  | such as slicing,             | integ  | ger a            | ray i          | indexing and  |
| Boolean array                                | y indexing along with their basic operations in Nu  | ımPy                         |        |                  |                |               |
| Case study on F                              | unctions:   | a of the come los            | o orth | and r            | otier          | a the gram of |
| • write a funct                              | of the corresponding elements of each   | s of the same lef            | igin,  | and I            | eturr          | is the sum of |
| UNIT – IV                                    | of the corresponding cicilients of cach.  |                              | 9 H    | rs               |                |               |
| Viennen en i Obiert                          | The first of the state and shipsts and shipsts  |                              |        | 1                |                | ad and calf   |
| classes and Object                           | s: Introduction, classes and objects, construct   | dol () mothod (              | on, C  | lass             | meth           | od and sell-  |
| nd private data m                            | embers private methods built-in class funct   | ions and attrib              |        | over             | an me<br>Ioadi | ng methods    |
| verriding methods.                           | chibers, private methods, suit in class funct   | ions and attrib              | uteo,  | 0,01             | Ioaan          | ing methodo,  |
| Write a progr                                | am to demonstrate how to create classes and obj   | ects in the applic           | ation  |                  |                |               |
| Case study on C                              | lasses  |                              |        |                  |                |               |
| Design a clas                                | s named QuadraticEquation for a quadratic equa  | tion ax <sup>2+bx+c</sup> =( | ). The | class            | s con          | tains:        |
| <ul> <li>The private</li> </ul>              | data fields a, b, c that represents three coefficien                                      | ts.                          |        |                  |                |               |
| • A construct                                | or for the arguments for a, b and c   |                              |        |                  |                |               |
| • Three get m                                | ethods for a, b and c   |                              |        |                  |                |               |
| • A method n                                 | amed getDiscriminant() that returns the discrimin   | nant, which is               |        |                  |                |               |
| U <sup>e</sup> -4aC.<br>• The metho          | ds named getRoot10 and getRoot20 for returni  | ng the two roots             | s of t | he er            | ni je ti       | on using the  |
| formulas                                     | as numer sentoerry and sentoerzy for return   |                              | 5 01 1 |                  | 1uau           | JII USIII UIC |
| $R_1 = -b + (\sqrt{b^2})$                    | $-4ac)/2a$ and $R_2 = -b - (\sqrt{b^2 - 4ac})/2a$ .                                       |                              |        |                  |                |               |
| • These meth                                 | nods are useful only if the discriminant is non   | negative. Let the            | ese n  | netho            | ds re          | turn 0 if the |
| discriminant                                 | is negative.  | <u> </u>                     |        |                  | -              | _             |
| • Write a test                               | t program that prompts the user to enter values   | for a, b, c and              | displa | iys th           | le res         | ult based on  |
| discriminant.                                |   |                              |        |                  |                |               |
|  |   |                              | 1      |                  |                |               |
| NIT – V                                      |   |                              | 9 H    | rs               |                |               |

| UNIT – V |  | 9 Hrs |
|----------|--|-------|
|----------|--|-------|

Inheritance: Introduction, inheriting classes in python, types of inheritance, complex objects, abstract classes and interfaces. Error and Exception Handing: Types of Errors, Exceptions, Handling Exceptions, types of exceptions
 Files & Database: Introduction to File Input and Output, Using Loops to Process Files, Introduction to database, standard methods, working with oracle database, case study (create employees table in the oracle database).
 Develop Python programs to exemplify the concepts of inheritance and overloading.

Write a program to create user defined exception and handle the exception in the application.

# Case study on Files

• Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be the input that to be written to the second file.

# Textbooks:

- 1. Allen B. Downey, "Think Python", 2nd edition, SPD/O'Reilly, 2016.
- 2. Reema thareja, Python Programming using problem solving approach, Oxford University Press.

# **Reference Books:**

- 1. Dietel and Dietel, Python How to Program.
- 2. Kenneth A. lambert, B.L. Juneja, Fundamentals of Python, Cengage Learning
- 3. James Payne, Beginning Python using Python2.6 and Python3

### **Online Learning Resources:**

- 1. https://www.python.org
- 2. https://learnpython.org

### Mapping of course outcomes with program outcomes

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | 3   |     |     |     |     |     |     |     |     |      |      |      | 2    | 2    |
| CO2 | 3   |     | 2   |     | 2   |     |     |     | 1   |      |      |      | 2    | 2    |
| CO3 |     | 2   |     | 2   | 2   |     |     |     |     |      |      |      | 2    | 2    |
| CO4 |     |     |     | 2   | 2   |     |     |     |     |      |      |      | 2    | 2    |
| CO5 |     |     | 1   |     |     |     |     |     |     |      |      |      | 2    | 2    |

| Course Code              |               |                   |           | a .                 |             |            |           |           |            | L            | Т       | Р        |         | С          |
|--------------------------|---------------|-------------------|-----------|---------------------|-------------|------------|-----------|-----------|------------|--------------|---------|----------|---------|------------|
| 20AES0506                |               | Co                | mputer    | Scienc              | ce And      | Enginee    | ering W   | orksho    | p          | 0            | 0       | 3        |         | 1.5        |
| Pre-requisite            | Ba            | sic Cor           | nputer    | Knowle              | edge        |            |           | Seme      | ster       |              |         | Ι-       | · II    |            |
| Course Outcome           | es (CO)       | :                 |           |                     |             |            |           |           |            |              |         |          |         |            |
| CO1: Asset               | mhle ar       | nd disas          | semblir   | ng narts            | ofaco       | mnuter     |           |           |            |              |         |          |         |            |
| <b>CO2:</b> Deve         | lon Doc       | numents           | s using ' | Word n              | rocesso     | rs         |           |           |            |              |         |          |         |            |
| CO3: Deve                | lop pre       | sentatio          | ne ilein  | g the n             | resenta     | tion tool  |           |           |            |              |         |          |         |            |
| CO4. Perfo               | rm con        | mutatio           | ne usin   | ig une pi           | dsheet      | tool       |           |           |            |              |         |          |         |            |
| CO5: Desig               | n Gran        | $\frac{1}{1}$     | ideos ar  | ng Sprea            | nages       | 1001       |           |           |            |              |         |          |         |            |
| Prenaring your of        |               | <b>P</b>          | lucos ai  | lu web              | pages       |            |           |           |            |              |         |          |         |            |
| Task 1: Assembli         | ing a C       | ompute            | er: Disa  | ssemble             | e and a     | ssemble    | the PC    | back t    | o worki    | ng cond      | lition. | Stu      | ident   | s should   |
| be able to trouble       | e shoot       | the cor           | nputer    | and ide             | entify w    | orking a   | and nor   | n-worki   | ng parts   | s. Stud      | ent sł  | noul     | d ide   | ntify the  |
| problem correctly        | by vari       | ious me           | thods a   | vailable            | e (eg: be   | eps). St   | udents    | should    | record t   | the pro      | cess c  | of as    | semb    | ling and   |
| trouble shooting a       | ι compι       | ıter.             |           |                     |             |            |           |           |            |              |         |          |         |            |
| Task 2: Install O        | perati        | ng syst           | em: Stu   | udent s             | hould i     | install Li | inux or   | n the co  | mputer     | . Stude      | ent ma  | ay ir    | nstall  | another    |
| operating system         | (includ       | ing pro           | prietary  | softwa              | re) and     | make tl    | he syste  | em dua    | l boot o   | r multi      | boot.   | Stu      | idents  | s should   |
| record the entire i      | nstalla       | tion pro          | cess.     |                     |             |            |           |           |            |              |         |          |         |            |
| Productivity tool        | IS<br>NOOSSOF | • Stude           | nto oho   | uld be c            | ble to c    | orente de  | oumen     | to main   | a the wo   | rd pro       | Pessor  | · too    | 1 Sor   | ne of the  |
| tasks that are to i      | he nerf       | ormed a           | are inse  | rting ar            | nd delet    | ting the   | charact   | ters wo   | ords and   | l lines      | Aligni  | men      | t of t  | he lines   |
| Inserting header a       | and Foo       | oter. cha         | anging t  | the font            | . chang     | ing the    | colour.   | includi   | ng imag    | es and       | table   | s in     | the v   | vord file. |
| making page setu         | ıp, copy      | y and p           | aste blo  | ock of t            | ext, im     | ages, tal  | bles, lir | nking tl  | ne image   | ,<br>es whic | ch are  | pre      | esent   | in other   |
| directory, formatt       | ing pa        | ragraph           | s, spell  | checki              | ng, etc     | . Studer   | nts sho   | uld be    | able to    | prepa        | re pro  | vject    | cove    | r pages,   |
| content sheet and        | chapte        | er pages          | s at the  | end of              | the tasl    | k using t  | the feat  | ures st   | udied. S   | tudent       | s shoi  | ald s    | subm    | it a user  |
| manual of the wor        | d proce       | essor co          | nsidere   | d.                  |             |            |           |           | 1          | <u> </u>     |         | <u> </u> | 1.0     | 1          |
| Task 4: Spreadsh         | ieet: S       | tudents           | should    | be able             | e to cre    | ate, ope   | n, save   | the ap    | plication  | 1 docur      | nents   | and      | l torm  | at them    |
| as per the requir        | inser         | Some              | deleti    | lasks li<br>ng cell | data        | format     |           | are Ma    | the cel    | the w        | orksn   | ing      | form    | ulas and   |
| functions, prepari       | ing cha       | rts, sor          | ting cel  | lig ten<br>ls. Stud | lents sł    | hould su   | ibmit a   | user n    | anual c    | of the S     | Spread  | lshe     | et ap   | nas anu    |
| considered.              |               |                   |           |                     |             | ioura ou   |           | ubbi ii   |            |              | produ   |          | or ap   | piioaaioii |
| Task 5: Presenta         | ations:       | creatin           | g, open   | ing, sa             | ving an     | ıd runni   | ng the    | presen    | tations,   | selecti      | ng th   | e st     | yle fo  | r slides,  |
| formatting the slic      | les witl      | h differe         | ent fonts | s, colou            | rs, crea    | ating cha  | arts and  | d tables  | s, inserti | ing and      | delet   | ing      | text,   | graphics   |
| and animations, b        | oulletin      | g and n           | umberi    | ng, hyp             | erlinkin    | ng, runn   | ing the   | slide sl  | now, set   | ting the     | e timi  | ng fo    | or slic | le show.   |
| Students should s        | submit        | a user r          | nanual    | of the              | Present     | tation to  | ol cons   | idered.   |            |              |         |          |         |            |
| loT<br>Teals 6: Deamhann | D:            |                   |           |                     |             |            |           |           |            |              |         |          |         |            |
| Study the orchite        | y Pi          | f Posph           | orry ni   | config              | ire soft    | wore In    | etall SI  | Doord     | Connec     | ot the c     | obles   | Inc      | 11 F    | Posphion   |
| (or any other) oper      | rating s      | i Kaspu<br>svstem | Configu   | re Wi-F             | i Remo      | ntely con  | nect to   | vour R    | aspherry   | v Pi         | abies,  | 1115     | nan N   | aspolati   |
| Story Telling            | rating t      | yotem,            | comiga    |                     | i, itellite | Jery con   | 11001 10  | your R    | uopoenij   | y 1 1.       |         |          |         |            |
| Task 7: Storytell        | ing           |                   |           |                     |             |            |           |           |            |              |         |          |         |            |
| Use Adobe spark o        | or any o      | other to          | ol to cre | eate Gra            | phics,      | Webpage    | es, and   | Videos.   |            |              |         |          |         |            |
| Reference Books          | :             |                   |           |                     |             |            |           |           |            |              |         |          |         |            |
| 1. B. Govindara          | aiulu. f      | 'IBM PO           | C and (   | Clones              | Hardwa      | are Trou   | ble sho   | ooting    | and Ma     | intenar      | nce". 2 | 2nd      | editi   | on. Tata   |
| McGraw-Hill,             | , 2002        |                   |           |                     |             |            |           | 0         |            |              | /       |          |         | - ,        |
| 2. "MOS study            | guide fo      | or word,          | , Excel,  | Powerp              | oint & (    | Outlook    | Exams'    | ", Joan   | Lamber     | t, Joyce     | e Cox,  | PHI      |         |            |
| 3. "Introduction         | n to Info     | ormation          | n Techn   | ology",             | ITL Edı     | acation S  | Solutior  | ns limite | ed, Pears  | son Ed       | ucatio  | n.       |         |            |
| 4. Rusen, "Netw          | vorking       | your co           | omputer   | rs and d            | levices"    | , PHI      |           |           |            |              |         |          |         |            |
| 5. Bigelows, "Tr         | ouble s       | shooting          | g, Maint  | aining 8            | & Repai     | ring PCs   | s", ТМН   | l.        |            |              |         |          |         |            |
|                          | . Deser       |                   |           |                     |             |            |           |           |            |              |         |          |         |            |
| Unline Learning          | , Resou       | irces:            |           |                     |             |            |           |           |            |              |         |          |         |            |
| 1. https://w             | ww.ado        | be.com            |           |                     |             |            |           |           |            |              |         |          |         |            |
| 2. https://w             | ww.ras        | pberryp           | 01.org    |                     |             |            |           |           |            |              |         |          |         |            |
| Manning of course of     | outcom        | es with .         | nrogram   | outcom              | es          |            |           |           |            |              |         |          |         |            |
|                          | PO2           | PO3               | PO4       | PO5                 | P06         | PO7        | POS       | P09       | PO10       | PO11         | P012    | 2 1      | PSO1    | PSO2       |
| CO1 2                    | 2             | 1.00              |           | 1.00                |             |            | 1.00      |           | 1010       |              |         | -+-      | 2       |            |
|                          |               | 2                 |           | 2                   |             |            |           | 4         |            |              | 4       | +        |         |            |
|                          | 4             | 4                 |           | 4                   |             |            |           | -         |            |              | 2       | +        | 4       | 4          |
| CO3 3                    | 2             | 2                 | 1         | 2                   | 2           | 1          |           | 1         | 1          |              | 2       | 1        | 2       | 2          |

(Levels of Correlation, viz., 1-Low, 2-Moderate, 3 High)

**CO**4

**CO**5

| Co      | urse Code     | Chomister Lab                                       |                  | L       | Т     | Р     | С   |
|---------|---------------|---|------------------|---------|-------|-------|-----|
| 20      | DABS9909      | Cnemistry Lab                                       |                  | 0       | 0     | 3     | 1.5 |
| Pre     | e-requisite   | Basics of chemical formulas and equations           | Semester         |         |       | I -   | II  |
| Cours   | e Outcomes    | (CO):   |                  |         |       |       |     |
|         | CO1: To fami  | liarize the students with the basic concepts of ch  | emistry of mate  | rials   |       |       |     |
|         | CO2: Prepare  | advanced polymer materials                          |                  |         |       |       |     |
|         | CO3: Measur   | e the strength of an acid present in secondary ba   | tteries          |         |       |       |     |
|         | CO4: To fami  | liarize with digital and instrumental methods of a  | analysis         |         |       |       |     |
|         |               |   |                  |         |       |       |     |
| List of | Experiments   | :   |                  |         |       |       |     |
| 1.      | Determinatio  | on of Hardness of a groundwater sample.             |                  |         |       |       |     |
| 2.      | Estimation o  | f iron (II) using Diphenylamine indicator (Dichro   | metry – Internal | indicat | or me | ethod | 1)  |
| 3.      | Determinatio  | on of pH metric titration of strong acid vs. strong | g base,          |         |       |       |     |
| 4.      | Conductome    | tric titration of strong acid vs. strong base       |                  |         |       |       |     |
| 5.      | Determinatio  | on of Fe(II) in Mohr's salt by potentiometric metho | od.              |         |       |       |     |
| 6.      | Determinatio  | on of percentage of Iron in Cement sample by cold   | orimetry         |         |       |       |     |
| 7.      | Determinatio  | on of Strength of an acid in Pb-Acid battery        |                  |         |       |       |     |
| 8.      | Preparation   | of phenol-formaldehyde resin                        |                  |         |       |       |     |
| 9.      | Preparation   | of TIO <sub>2</sub> /ZnO nano particles             |                  |         |       |       |     |
| 10.     | Estimation o  | f Calcium in port land Cement                       |                  |         |       |       |     |
| 11.     | Adsorption of | f acetic acid by charcoal                           | ·                |         |       |       |     |

12. Thin layer chromatography

# Mapping of course outcomes with program outcomes

|     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | 3   |     |     |     |     |     |     | 2   |     |      |      |      |      |      |
| CO2 | 3   |     | 1   |     |     |     |     | 2   |     |      |      |      |      |      |
| CO3 | 3   | 1   | 1   |     |     |     |     | 2   |     |      |      |      |      |      |
| CO4 | 3   |     | 2   |     |     |     |     | 2   |     |      |      |      |      |      |

| Course Code            | Data Streature   | - T - h                                | L       | Т      | Р                  | С                        |  |  |  |  |  |  |
|------------------------|--|--|---------|--------|--------------------|--------------------------|--|--|--|--|--|--|
| 20AES0504              |  | es Lad                                 | 0       | 0      | 3                  | 1.5                      |  |  |  |  |  |  |
| Pre-requisite          | Basic Mathematics  |  | II      |        |                    |                          |  |  |  |  |  |  |
| Course Objectives:     | · · · · · · · · · · · · · · · · · · ·  |  | •       |        |                    |                          |  |  |  |  |  |  |
| To introduce           | to the different data structures   |  |         |        |                    |                          |  |  |  |  |  |  |
| To elucidate           | how the data structure selection influence   | es the algorithm complex               | xity    |        |                    |                          |  |  |  |  |  |  |
| • To explain th        | e different operations that can be perform   | ied on different data stru             | acture  | es     |                    |                          |  |  |  |  |  |  |
| To introduce           | to the different search and sorting algorit  | hms.                                   |         |        |                    |                          |  |  |  |  |  |  |
|                        |  | .1 11                                  |         |        |                    |                          |  |  |  |  |  |  |
| • CO1: Select          | the data structure appropriate for solving   | the problem                            |         |        |                    |                          |  |  |  |  |  |  |
| • <b>CO2</b> . Intplet | new data types   |  |         |        |                    |                          |  |  |  |  |  |  |
| • CO3. Derive          | the the working of linear and non linear do  | to structure                           |         |        |                    |                          |  |  |  |  |  |  |
| • <b>CO5</b> : Organi  | ze the data using Files structure  | lla structure                          |         |        |                    |                          |  |  |  |  |  |  |
| aboratory Experim      | ents   |  |         |        |                    |                          |  |  |  |  |  |  |
| 1. String opera        | tions using array of pointers  |  |         |        |                    |                          |  |  |  |  |  |  |
| 2. Searching Al        | gorithms (With the Number of Key Compa   | risons) Sequential, Bina               | ry and  | d Fibe | onacc              | zi                       |  |  |  |  |  |  |
| Search Algor           | ithms.   | · _ ·                                  |         |        |                    |                          |  |  |  |  |  |  |
| 3. Sorting Algor       | rithms: Insertion Sort, Selection Sort, Shel   | ll Sort, Bubble Sort, Qui              | ck So   | rt, He | ap S               | ort,                     |  |  |  |  |  |  |
| Merge Sort, a          | and Radix Sort. Using the system clock, co   | ompute the time taken for              | or sor  | ting o | f eler             | nents.                   |  |  |  |  |  |  |
| The time for           | other operations like I/O etc should not b   | e considered while comp                | outing  | time   |                    |                          |  |  |  |  |  |  |
| 4. Implementat         | ion of Singly Linked List, Doubly Linked L   | ist, Circular Linked List              |         |        |                    |                          |  |  |  |  |  |  |
| 5. Stack impler        | entation using arrays  |  |         |        |                    |                          |  |  |  |  |  |  |
| 6. Stack impler        | entation using linked lists  |  |         |        |                    |                          |  |  |  |  |  |  |
| 7. Queue inipie        | inemation using arrays. Implement unlere   | a guova. No positions al               | e imp   | be let | $\frac{1000}{100}$ | you                      |  |  |  |  |  |  |
| 8 Queue imple          | mentation using linked lists   | e queue. No positions si               | Iouiu   | De lei | t Dia              | IIK.                     |  |  |  |  |  |  |
| 9 Creation of h        | inary search tree performing operations i  | nsertion deletion and t                | raver   | sal    |                    |                          |  |  |  |  |  |  |
| 10. Breadth first      | search   | insertion, deletion, and t             | laver   | 541.   |                    |                          |  |  |  |  |  |  |
| 11. Depth first s      | earch  |  |         |        |                    |                          |  |  |  |  |  |  |
| 12. Travelling sa      | les man problem  |  |         |        |                    |                          |  |  |  |  |  |  |
| 13. File operation     | ns   |  |         |        |                    |                          |  |  |  |  |  |  |
| 14. Indexing of a      | ι file   |  |         |        |                    |                          |  |  |  |  |  |  |
| 15. Reversing th       | e links (not just displaying) of a linked list   |  |         |        |                    |                          |  |  |  |  |  |  |
| 16. Consider a li      | nked list consisting of name of a person as  | nd gender as a node. Ar                | range   | the li | nked               | list                     |  |  |  |  |  |  |
| using 'Ladies          | s first' principle. You may create new linke   | d lists if necessary.                  | _       |        |                    |                          |  |  |  |  |  |  |
| 17. An expressio       | n can be represented in three ways: infix,   | prefix and postfix. All th             | ne forr | ns ar  | e nec              | essary                   |  |  |  |  |  |  |
| in different c         | ontexts. Write modules to convert from on  | e form to another form.                |         | 1      |                    |                          |  |  |  |  |  |  |
| 18. A table can t      | be defined as a collection of rows and columns are stored in the colle of the table. The | mns. Each row and colu                 | mn m    | ay na  | $\frac{1}{2}$      | label.                   |  |  |  |  |  |  |
| operations li          | ke summation, overage etc can be perform   | e values call be of difference         | nich o  | ontoi  | es. N              | uniencal<br>merical data |  |  |  |  |  |  |
| Such operati           | ions are to be prevented on data which is t  | not numeric User may 1                 | ike to  | inser  | t row              | $\frac{1}{2}$            |  |  |  |  |  |  |
| the already e          | existing table. User may like to remove row  | /column. Create table d                | lata ty | vpe at | nd su              | pport                    |  |  |  |  |  |  |
| different ope          | rations on it.   |  | iata tj | pou    | 14 50              | pport                    |  |  |  |  |  |  |
| extbooks:              |  |  |         |        |                    |                          |  |  |  |  |  |  |
| 1. Ellis Horowit       | z and Sartaj Sahni, "Fundamentals of Dat   | ta Structures in C", 2 <sup>nd</sup> I | Editio  | n, Ga  | lgotia             | a Book                   |  |  |  |  |  |  |
| Source, Pvt.           | Ltd., 2004.  |  |         |        | -                  |                          |  |  |  |  |  |  |
| 2. Alan L. Thar        | p, "File Organization and Processing", Wile  | ey and Sons, 1988.                     |         |        |                    |                          |  |  |  |  |  |  |
| eference Books:        |  |  |         |        |                    |                          |  |  |  |  |  |  |
| 1. D. Samanta, '       | 'Classic Data Structures", 2nd Edition, Pre  | ntice-Hall of India, Pvt.              | Ltd., I | ndia,  | 2012               | 2.                       |  |  |  |  |  |  |
| 2. Richard F.Gil       | berg, Behrouz A.Forouzan, "Data Structur   | es A Pseudo code Appro                 | ach w   | rith C | ", Sec             | cond Edition,            |  |  |  |  |  |  |
| Cengage Lear           | ning 2005.   |  |         |        |                    |                          |  |  |  |  |  |  |
| Online Learning R      | esources:  |  |         |        |                    |                          |  |  |  |  |  |  |
| https://www            | v.youtube.com/watch?v=zWg7U0OEAoE&   | list=PLBF3763AF2E1C5                   | 72F     |        |                    |                          |  |  |  |  |  |  |
|                        |  |  |         |        |                    |                          |  |  |  |  |  |  |

# Mapping of course outcomes with program outcomes

|     | PO1 | PO2 | PO3 | PO4 | PO5 | P06 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| C01 | 3   | 2   |     | 2   |     |     |     |     |     |      |      | 2    | 2    |      |
| CO2 | 3   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 1    | 2    | 2    |
| CO3 | 3   | 2   | 2   | 2   |     |     |     |     |     |      |      | 1    | 2    | 1    |
| C04 | 3   | 2   | 2   | 2   | 2   |     |     |     |     |      |      | 1    | 2    |      |
| C05 | 3   | 2   | 2   | 2   |     |     |     |     |     |      |      | 1    | 2    |      |

| Course Code  |  | L  | Т   | Р   | С                                      |   |
|--|--|--|---|---|--|---|
| 20AMC9903  | Environmental Studies  | 5  | 3   | 0   | 0                                      | 0   |
| Pre-requisite  | Basic Environmental Knowledge  | Semester   |   | II  |  |   |
| Course Outcomes (  | CO):   |  |   |   |  |   |
| CO1: To recogni  | ze and to understand the importance and scope of Env   | ironmental Studies   |   |   |  |   |
| CO2: To unders     each other in the   | tand the importance of protecting natural resources, e   | cosystem for future  | e gene  | ration  | by co                                  | mmunication   |
| • <b>CO3:</b> Students   | become conversant with the fact that there is a need   | to create a concern  | ı for o   | ur en   | vironr                                 | nent that will  |
| trigger pro-enviro   | onmental action; including simple activities we can do i   | n our daily life to p  | rotect  | it.   |  |   |
| • <b>CO4:</b> By studyin   | ng Environmental Science, students are exposed to the  | e environment the e  | nables  | s one   | to find                                | l out solution  |
| of various enviror   | nmental problems, encountered on and often.  | o identify and anal  |   | wiron   | nento                                  | I problems as   |
| well as the risks  | associated with these problems and efforts to be taken   | to protect the envi  | ronme   | ent fro   | m get                                  | ting polluted.  |
| These will enable  | every human being to live in a more sustainable mann   | ner.   |   |   |  |   |
| UNIT – I   |  |  | 18 I  | Irs   |  |   |
| Multidisciplinary N  | lature of Environmental Studies: Introduction  | – Multidisciplina  | ry Na   | ture  | of En                                  | vironmental   |
| Studies – Definition,  | Scope and Importance – Need for Public Awaren  | less.  |   |   |  |   |
| natural Resources  | Renewable and non-renewable energy reso  | urces – Natural  | reso  | urces   | and                                    | associated  |
| Forest resources: U  | Jse and over – exploitation, deforestation, case   | studies – Timber   | extra   | action  | – M                                    | ining, dams   |
| and other effects on   | forest and tribal people.  |  |   |   |  |   |
| Water resources:   | Use and over utilization of surface and sub-sur  | face – Floods, dr  | ought   | :, con  | flicts                                 | over water,   |
| Mineral resources:   | Use and exploitation, environmental effects of e   | xtracting and usi  | ing m   | inera   | 1 reso                                 | ources, case  |
| studies.   | ······   | 8  | 8   |   |  |   |
| Food resources: W  | Vorld food problems, changes caused by agric   | culture and over   | graziı  | ng, e   | ffects                                 | of modern   |
| Energy resources:  | Renewable and non-renewable energy resources.  | e studies.   |   |   |  |   |
| UNIT – II  |  |  | 20 I  | Irs   |  |   |
| <b>Biodiversity And It</b><br>of biodiversity: cons<br>global, National and<br>biodiversity: habitat   | <b>ts Conservation :</b> Introduction- Definition: gene<br>sumptive use, Productive use, social, ethical, ac<br>d local levels – India as a mega-diversity natio<br>loss, poaching of wildlife, man – wildlife conflict  | etic, species and o<br>esthetic and opti<br>on – Hot-sports o<br>is – Conservation                                   | ecosy<br>on va<br>of bio<br>1 of bi                     | stem<br>dues<br>diver:<br>odive                   | diver<br>– Bio<br>sity –<br>rsity:     | sity – Value<br>odiversity at<br>Threats to<br>In-situ and                              |
| Ex-situ conservation   | n of biodiversity.   |  | 101   | Iro   |  |   |
|  |  | . 1  | 101   | 115   | D 11                                   |   |
| pollution, Soil pollut<br>Solid Waste Manag<br>individual in prever<br>cyclone, Tsunami ar   | <b>Gement:</b> Definition, Causes, effects and its control, Marine pollution, Noise pollution, Thermal programment: Causes, effects and control measures of notion of pollution – Pollution case studies – and landslides.   | pollution and Nuc<br>of urban and ind<br>Disaster manage   | lear h<br>ustria  | al wa<br>t: floo                                  | fonu<br>1s.<br>stes -<br>ods,          | - Role of an<br>earthquake,   |
| UNIT – IV  |  |  | 15 I  | Irs   |  |   |
| <b>Social Issues and t</b><br>to energy – Water<br>rehabilitation of peo<br>global warming, a<br>Wasteland reclamati<br>Control of Pollution | <b>he Environment:</b> From Unsustainable to Sustai<br>conservation, rain water harvesting and wa<br>ple – Case studies – Environmental ethics: Issu<br>icid rain, ozone layer depletion, nuclear a<br>ion. – Consumerism and waste products. – Envir<br>) Act. – Water (Prevention and control of Pollu<br>Public awareness | nable developmen<br>atershed manage<br>es and possible s<br>accidents and b<br>onment Protectio<br>ttion) Act – Wild | nt – U<br>ement<br>solutio<br>holoca<br>n Act<br>life P | rban<br>– F<br>ons –<br>aust.<br>. – Ai<br>rotect | prob<br>Clim<br>Cas<br>r (Pre<br>ion A | lems related<br>lement and<br>late change,<br>e Studies-<br>vention and<br>Act - Forest |
| UNIT – V   | une awareness.   |  | 10 I  | Irs   |  |   |
| Human Population<br>Family Welfare Prog  | l<br><b>and the Environment:</b> Population growth, varia<br>rammed. – Environment and human health – Hu   | ation among natio<br>man Rights – Val  | ons. P<br>ue Ec   | opula<br>lucat                                    | ation<br>ion –                         | explosion –<br>HIV/AIDS –   |
| Women and Child W  | <u> Velfare – Role of information Technology in Enviro</u>   | onment and huma  | an he   | alth -  | - Case                                 | e studies.  |
| 1 Trank 1 1- C   | Environmental Ctudios for Underson desets O  | on her Frank Di-   |   | fort  |  | aita Cranta   |
| 1. Text book of<br>Commission  | Environmental Studies for Undergraduate Cours  | es by Erach Bhar   | ucna  | ior U   | niver                                  | sity Grants   |
| 2. Environment   | al Studies by Kaushik, New Age Publishers.   |  |   |   |  |   |
| 3. Environment   | al Studies by Sri Krishna Hitech publishing Pvt.   | Ltd.   |   |   |  |   |
| Reference Books:   | · · · · · ·  |  |   |   |  |   |
| 1. Environment<br>2. Comprehensi   | al studies by R.Rajagopalan, Oxford University P<br>ive Environmental studies by J.P.Sharma. Laxmi   | ress.<br>publications.   |   |   |  |   |

2. Comprehensive Environmental studies by J.P.Sharma, Laxmi publications.

- 3. Introduction to Environmental engineering and science by Gilbert M. Masters and Wendell P. Ela -Printice hall of India Private limited.
- 4. Environmental studies by A. Ravi Krishnan, G. Sujatha Sri Krishna Hitech publications.

## **Online Learning Resources:**

www.nptel.ac.in

### Mapping of course outcomes with program outcomes

|     | PO1 | PO2 | PO3 | PO4 | PO5 | P06 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|
| CO1 | 3   | 1   | 1   |     |     | 1   | 3   |     |     |      |      |      |      |      |
| CO2 | 3   | 1   | 1   |     |     | 1   | 3   |     |     |      |      |      |      |      |
| CO3 | 3   | 1   | 1   |     |     | 1   | 3   |     |     |      |      |      |      |      |
| CO4 | 3   | 1   | 1   |     |     | 1   | 3   | 2   |     |      |      |      |      |      |
| CO5 | 3   | 1   | 1   |     |     | 1   | 3   | 2   |     |      |      | 1    |      |      |