| | | Walchar | nd College of | Engineering, | Sangli | |
|-------------|--------|--------------------------|---------------------|---------------------------------------|----------------------|---------------|
| | | | overnment Aiaea A | Autonomous Institute, |) | |
| | | | Course In | formation | | |
| Program | me | | B.Tech. | ioi mation | | |
| Class, Se | mester | • | First Year B.Te | ch., Sem I & II | | |
| Course C | ode | | | | | |
| Course N | ame | | Engineering P | hvsics | | |
| Desired I | Requis | ites: | Students are ex | pected to know the | basic concept in Ph | vsics. |
| | Teach | ing Scheme | | Examination S | Scheme (Marks) | |
| Lecture | | 3 Hrs/week | T1 | T2 | ESE | Total |
| Tutorial | | - | 20 | 20 | 60 | 100 |
| Practical | | - | | I | | |
| Interaction | n | - | | Cre | dits: 3 | |
| | | | | | | |
| 1 | | To provide basic co | ncepts to solve | many engineering | g and technical iss | ues. |
| 2 | | To give deep insigh | ts into the unde | rstanding of engin | neering courses. | |
| 3 | | To encourage them | to understand e | ngineering and te | chnical developm | ent. |
| | | Course Out | comes (CO) with | h Bloom's Taxono | omy Level | |
| | State | Kepler's law, Plank | s quantum hypo | othesis, de-Brogli | e's law, Compton | |
| CO1 | effec | t, Heisenberg's unc | ertainty princip | ole, Describe opt | ical phenomenon | Demonstration |
| COI | Such | as interference, diff | tions Hall offe | at Earmi Direa | s of wave model. | Remembering |
| | effec | t | tions, man ene | ct, Ferni-Dirac s | ausues. Seebeek | |
| | Expl | ain Planck's quantu | n hypothesis | Schrödinger's wa | ve equations and | |
| | their | applications: Expl | ain the metho | ds of production | in and detection | |
| CO2 | meth | ods of ultrasonic wa | ves and its app | lications, Show 1 | notion of particle | Understanding |
| | unde | r central force field, | Discuss two b | ody problem, ene | ergy equation and | C |
| | diagr | am, | | • | | |
| | Class | sify transducers, and | sensors and the | eir applications. | Classify solids on | |
| CO3 | the b | basis of band theory | ; Explain ferm | i level and its b | ehavior in metal, | Applying |
| | semi | conductor and insula | tor. Solve the p | roblems on electr | rical Conductivity | |
| Madada | and I | Hall effect. | Comme Com | . . . | | TT |
| Niodule | Onti | s. Introduction types | course Cor | ntents action types of di | ffraction Fresnel's | Hours |
| | diffra | ction: Fresnel's half | period zones, zo | ne plate, diffractio | n at straight edge. | |
| Ι | Fraur | hofer's diffraction: | diffraction due | to single slit, d | ouble slits, plane | 7 |
| | diffra | ction grating. Polariza | tion: optical activ | vity, specific rotation | on of optical active | |
| | subst | ances, Laurent's half s | hade polarimeter | | | |
| | Quar | itum Physics: Introdu | ction, black bod | y radiation, Planck | 's quantum theory, | |
| | veloc | ity and particle veloc | ity de-Broglie's | - Jeans law, pilas hypothesis Com | nton effect: theory | |
| II | and | experimental verifica | ation, Heisenber | rg's uncertainty | principle and its | 7 |
| | applie | cations, wave function | n and its physic | cal significance, S | chrödinger's wave | |
| | equat | ion: time independen | t and time depe | ndent, application | s of Schrödinger's | |
| | wave | equation. | -1:f: -: f | · · · · · · · · · · · · · · · · · · · | | |
| | | onic wayes (Magnet | classification of s | sound, ultrasonic w | aves, generation of | |
| Ш | ultras | onic waves (Magnet | s tube thermal of | detection and sensi | tive flame method | 7 |
| | veloc | ity of ultrasonic wa | ves in liquid, a | applications of ul | trasonic waves in | |
| | scien | tific and engineering fi | eld. | | | |
| IV | Solid | State Physics: In | troduction, form | nation of energy | bands in solid, | 6 |
| 11 | classi | fication of solid on the | e basis of band t | heory, number leve | els in band, density | 0 |

| | of s | states, Fe | rmi-Di ture f | rac sta | tistics, | Fermi | level, | varia vical | atio | n of Fe | ermi le | vel wit | h chan | ge nd | | | |
|-----------|------------|--|--|----------------|----------------|-------------------|---------------------|----------------|-------------|----------------------|-----------|---------------|----------------------|--------------|-------|---------|-------|
| | sen | niconduct | tor, Ha | ll effec | rt, basic | conce | ept of p | n ji | unci | tion. | Ivity | | Juli a | nu | | | |
| | Gr | avitation | and | Centr | al Fo | ce M | lotion: | La | w | of grav | vitatior | n, Gra | vitatior | nal | | | |
| | pot | ential en | ergy, | Inertia | l and | gravit | ational | ma | lss, | Potent | ial an | d field | l due | to | | | |
| V | sph | f states, Fermi-Dirac statistics, Fermi level, variation of Fermi level with change temperature for semiconductor, electrical conductivity of metal and emiconductor, Hall effect, basic concept of p-n junction. ravitation and Central Force Motion: Law of gravitation, Gravitational dotted land solid sphere, Motion of a particle under a central force field, wo body problem and its reduction to one-body problem and its solution, The nergy equation and energy diagram, Kepler's Laws, Satellite in circular orbit and pplications, Geosynchronous orbits. Omputer Instrumentation: Introduction, instrumentations, measurement ystem, control system, Transducers, and Sensor: transducers, sensors, lassification of transducers, strain gauge, pressure transducers, force ansducers, optical transducers, strain gauge, pressure transducers, optical transducers, actuators. M. N. Avadhanulu and P. G. Kshirsagar, "A Text book of Engineering Physics", S.Chand Pub. R. K. Gaur and S. L. Gupta "Engineering Physics", Dhanpat Rai Publications, 2011 A. Beiser, "Concepts of Modern Physics", McGraw Hill International, 5th edition, 2003. Ajoy Ghatak, "Optics", Tata McGraw Hill Sth edition, 2013. D. N. Mathews, K. Venkatesan, "Text Book of Quantum Mechanics", Tata McGraw Hill M.K Harbola, "Engineering Mechanics", Cengage 2^{tad} edition, 2013. D. N. Buteppire & R. Kolenkow, "An Introduction to Mechanics", McGraw Hill Education, Useful Links For optics https://nptel.ac.in/courses/12/10/12/2106034// For Optics https://nptel.ac.in/courses/12/2106/12106 | | | | | | | | | | | | | | | |
| • | Tw | states, Fermi-Dirac statistics, Fermi level, variation of Fermi level with change temperature for semiconductor, electrical conductivity of metal and miconductor, Hall effect, basic concept of p-n junction. ravitation and Central Force Motion: Law of gravitation, Gravitational tential energy, Inertial and gravitational mass, Potential and field due to herical shell and solid sphere, Motion of a particle under a central force field, vo body problem and its reduction to one-body problem and its solution, The ergy equation and energy diagram, Kepler's Laws, Satellite in circular orbit and plications, Geosynchronous orbits. mputer Instrumentation: Introduction, instrumentations, measurement stem, control system, Transducers, strain gauge, pressure transducers, sensors, assification of transducers, characteristics of transducers, selection criterion for nsducers, temperature transducers, strain gauge, pressure transducers, force insducers, optical transducers, actuators. M. N. Avadhanulu and P. G. Kshirsagar, "A <i>Text book of Engineering Physics</i> ", S.Chand Pub. R. K. Gaur and S. L. Gupta " <i>Engineering Physics</i> ", John Wiley, 9 th edition 2011 References Halliday, Resnic and Walker, " <i>Fundamentals of Physics</i> ", John Wiley, 9 th edition, 2003. Ajoy Ghatak, "Optics", Tata McGraw Hill Sth edition, 2012. P. M. Mathews, K. Venkatesan, " <i>Text Book of Quantum Mechanics</i> ", Tata McGraw Hill M.K Harbola, " <i>Engineering Mechanics</i> ", Cengage 2 ^{ml} edition, 2013. D. Kleppner & R. Kolenkow, " <i>An Introduction to Mechanics</i> ", McGraw Hill Education, Useful Links For optics https://nptel.ac.in/courses/122/107/122107035/ For Quantum Physics https://nptel.ac.in/courses/122/107/12107035/ For Solid State Physics https://nptel.ac.in/courses/115/105/115/105/099/ For Gravitation https://nptel.ac.in/courses/115/105/115/105/099/ For Gravitation https://nptel.ac.in/courses/122/107/122106034/ For Solid State Physics https://nptel.ac.in/courses/122/107/122106034/ For Solid State Physics https://nptel.ac.in/courses/135/105/115/105/099/ For G | | | | | | | | | | | | | | | |
| | ene | states, Fermi-Dirac statistics, Fermi level, variation of Fermi level with change temperature for semiconductor, electrical conductivity of metal and niconductor, Hall effect, basic concept of p-n junction. avitation and Central Force Motion: Law of gravitation, Gravitational ential energy, Inertial and gravitational mass, Potential and field due to erical shell and solid sphere, Motion of a particle under a central force field, o body problem and its reduction to one-body problem and its solution, The 8 regy equation and energy diagram, Kepler's Laws, Satellite in circular orbit and plications, Geosynchronous orbits. mputer Instrumentation: Introduction, instrumentations, measurement tem, control system, Transducer and Sensor: transducers, sensors, stification of transducers, actuators. 6 Text Books M. N. Avadhanulu and P. G. Kshirsagar, "A <i>Text book of Engineering Physics</i> ", S.Chand Pub. 8 R. K. Gaur and S. L. Gupta "Engineering Physics", John Wiley, 9th edition, 2003. 6 Algo Generating Physics", Tata McGraw Hill International, 5th edition, 2003. Algo Ghodern Physics", Cengage 2nd edition, 2011. A Beiser, "Concepts of Modern Physics", Cengage 2nd edition, 2013. D. Kelppner & R. Kolenkow, "An Introduction to Mechanics", McGraw Hill Education, Useful Links For optics https://ptel.ac.in/courses/122/107/12210035/ For optics https://ptel.ac.in/courses/122/107/12106034/ For Gravitation http://digimat.in/nptel/courses/121/01/121/01/035/ | | | | | | | | | | | | | | | |
| | app | lications | , Geosy | ynchro | nous of | bits. | 1 | | • • | | | | | | | | |
| | Co | mputer | Instr | ument | ation: | Intro | duction | l, : a | inst Sor | rument | ations, | mea | sureme | ent | | | |
| VI | sys cla | sification | n of tr | ansduc | n, n ers ch | ansuuc aracter | ristics o | u f tre | anse | lisor. Jucers | selecti | on crit | erion f | rs, | | | |
| • 1 | trai | sducers. | tempe | erature | transd | ucers. | strain | gau | ige. | pressi | ire tra | nsduce | rs. for | ce | | 6 | |
| | trai | sducers, | optica | l transc | lucers, | actuat | ors. | 0 | -0-, | r | | | , | | | | |
| | | | - | | | r | Text Bo | ook | S | | | | | | | | |
| 1 | | M. N. A | vadhar | ulu an | d P. G. | Kshir | sagar, " | A T | <i>ext</i> | book o | f Engir | neering | Physic | cs ", | , S.C | Chand | Pub. |
| 2 | | R. K. Ga | ur and | S. L. 0 | Gupta ' | 'Engin | neering | Phy | sics | s", Dha | npat R | ai Pub | lication | ns, 2 | 2011 | 1 | |
| | | | | | | | Refere | nces | 5 | | | | | | | | |
| 1 | | Halliday | , Resn | ic and ` | Walker | , "Fur | ıdamen | tals | of | Physics | s", Joh | n Wile | y, 9 th e | ditic | on 2 | 011. | |
| 2 | | A. Beiser, "Concepts of Modern Physics", McGraw Hill International, 5th edition, 2003. | | | | | | | | | | | | | | | |
| 3 | | Ajoy Gh | joy Ghatak, "Optics", Tata McGraw Hill 5th edition, 2012. | | | | | | | | | | | | | | |
| 4 | | P. M. M | Joy Ghatak, " <i>Optics</i> ", Tata McGraw Hill 5th edition, 2012. M. Mathews, K. Venkatesan, " <i>Text Book of Quantum Mechanics</i> ", Tata McGraw Hill | | | | | | | | | | | | | | |
| 5 | | M.K Ha | rbola, | "Engin | neering | Mech | anics", | Cer | ngag | ge 2 nd e | dition, | 2013. | | | | | |
| 6 | | D. Klep | oner & | R. Ko | lenkow | , "An | Introdu | ctio | on te | o Mech | anics " | , McG | raw Hi | 11 Ec | luca | tion, | |
| | | | | | | ι | J seful I | _ink | s | | | | | | | | |
| 1 | | For option | cs <u>http</u> | s://npt | el.ac.in | /cours | es/122/ | 107 | /122 | 210703 | <u>5/</u> | | | | | | |
| 2 | | For Qua | ntum P | hysics | https: | //npte | l.ac.in/c | our | ses/ | /122/10 | 6/1221 | 106034 | / | | | | |
| 3 | | For Ultra | asonics | s <u>https</u> | s://freev | videole | ectures. | com | n/co | urse/35 | 531/eng | gineeri | ng-phy | sics | -i/8 | | |
| 4 | | For Soli | d State | Physic | es <u>http</u> | s://npte | el.ac.in/ | 'cou | rse | <u>s/115/1</u> | 05/115 | <u>510509</u> | <u>9/</u> | | | | |
| 5 | | For Grav | vitation | ı <u>http</u> | ://digin | nat.in/ | nptel/co | ours | es/v | video/1 | 15107 | 121/L1 | <u>1.html</u> | | | | |
| 6 | | Basics o | f Instru | imenta | tion <u>h</u> | ttps://v | www.yo | outu | be. | com/wa | atch?v: | =qbKn | W42ZI | <u>M5c</u> | | | |
| | | | | CO- | PO Ma | apping | g For A | II B | S.Te | ch. Pr | ogram | S | | | | | |
| | | | 1 | 1 | Progr | amme | Outco | me | s (P | 0) | | | | | | PSO | 1 |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 1 | | 2 | 3 |
| CO1 | 2 | | | | | | | | | | | | | | | | |
| CO2 | 2 | | | | | | | | | | | | | | | | |
| CO3 | 2 | | | | | | | | | | | | | | | | |
| |] | The streng | gth of 1 | nappin | g is to | be wri | tten as | 1,2, | 3; V | Where, | 1:Low | , 2:Me | dium, 3 | B:Hi | gh | | |
| | | | 1 0 | | Asses | smen | t (for T | heo | ory | Course | e) | | 1 77.0 // | - | • | | |
| The asses | sme | it is base | d on 2 | in-sem | ester e | kamina | ations ii | n the | e to | rm of | [1] (Tes | st-1) an | d T2 (| lest- | -2) c | of 20 i | narks |
| 2 T2 has | o the | re shall b | e I En | u-sem | examin | SE ch | (ESE) (all ba a | 01 0 n al | 0 m 1 m | arks. 1 | I shall | be typ | $\frac{1}{100}$ | on n ight | 1001 | nes i | and |
| 2, 12 bas | 1 to 4 | and 50% | 6 weig | htage c | n mod | ules 5 | 6 6 | 11 a1 | 1 1110 | ouules | with h | cally J | 070 WC | Igitt | age | 011 | |
| mountes | A | ssessmer | nt Plan | based | on Bl | om's | Taxon | omv | v Le | evel (M | [arks) | For T | heory | Cou | rse | | |
| В | loon | 's Taxon | omy I | level | - | | T1 | - • | | T2 | |] | ESE | | | Tota | al |
| 1 | | R | Remem | ber | | | 8 | | | 8 | | - | 24 | | | 40 | |
| 2 | | U | Inderst | and | | ļ | 8 | | | 8 | | L | 24 | | | 40 | |
| 3 | | | Apply | / | | | 4 | | | 4 | | | 12 | | | 20 | |
| 4 | | | Analyz | ze | | | 0 | | | 0 | | | 0 | | | 0 | |
| 5 | | | Evalua | te | | | 0 | | | 0 | | | 0 | | | 0 | |
| 6 | | | Creat | e | | L | 0 | | | 0 | | | 0 | | | 0 | |
| | - 1 | Tota | 1 | | | - | 20 | | | 20 | | | 60 | | | 100 |) |

| | Walchar | nd College of | Engineering, | Sangli | |
|--------------|---|-----------------------|-----------------------|---------------------|-------------------|
| | (G_{ℓ}) | overnment Aided A | utonomous Institute) | | |
| | | AY 20 | 121-22 formation | | |
| Programme | | B Tech | | | |
| Class. Semes | ter | First Year B Te | ch Sem I | | |
| Course Code | | That I car D. I c | enii, Benn I | | |
| Course Nam | ~ P | Engineering M | athematics- I | | |
| Desired Reg | uisites: | Students are ex | pected to know the | basic concept in N | lathematics |
| Tea | ching Scheme | brudents are ex | Examination S | Scheme (Marks) | lutioniutios. |
| Lecture | 3 Hrs/week | T1 | Т2 | ESE | Total |
| Tutorial | 1 Hrs/week | 20 | 20 | 60 | 100 |
| Practical | - | 20 | 20 | 00 | 100 |
| Internetion | - | | Crea | J:4a. A | |
| Interaction | - | | Cre | ans: 4 | |
| 1 | T. 1 | Course O | bjectives | | |
| 1 | To develop mathemat | ical skills and e | nnance thinking p | bower of students | |
| 2 | fields | ital concepts of I | mathematics and t | neir applications i | n engineering |
| | Course Out | comes (CO) wit | h Bloom's Taxono | omv Level | |
| CO1 | Illustrating mathematica | al concepts in eng | gineering field. | | Understanding |
| COO | Use mathematical and | d computational | l methods to sol | ve problems in | A 1 . |
| 02 | science and engineerin | g field | | • | Applying |
| Module | | Course Co | ontents | | Hours |
| | Matrices: Rank of matr | ix, Homogeneou | s and non-homoger | neous linear | |
| Ι | equations, symmetric ar | d skew symmetr | ic and orthogonal r | natrices, Eigen | 6 |
| | matrices | | incorenii, Diagonan | sation of | |
| н | Calculus: Rolle's theor | em, Mean value | theorem, Taylor's a | and Maclaurin's | 6 |
| 11 | theorem with remainder | s, L'hospital rule | and indeterminate | forms | 6 |
| | Complex Number: Pol | ar form of compl | ex number, Argano | d's diagram, De | |
| III | Moiver's theorem, roots | of complex num | iber, Hyperbolic fu | nction, | 7 |
| | exponential form of con | nplex number, re | lation between circ | ular and | |
| | Partial Differentiation | and its applicat | ion : Partial deriva | tive, chain rule | |
| 13.7 | for partial differentiation | n, Euler's theorem | n for homogeneous | s and non- | 0 |
| IV | homogeneous function, | Jacobian, Error a | and approximation, | maxima and | 8 |
| | minima of function of tw | vo variables. | | | |
| N Z | First order ODE and i | ts application: E | xact, Linear, Berno | oulli's equations, | |
| v | circuit | gonal trajectory, | , applications to sin | nple electric | 8 |
| VI | Curve tracing: Tracing | of curves for Ca | rtesian and polar c | oordinate. | 5 |
| | | Text I | Books | | |
| 1 | A Text Book of Applied | l Mathematics, V | ol I and II", P. N. | and J. N. Wartikar | , Vidyarthi Griha |
| 1 | Prakashan, Pune, 2006. | | | | - |
| 2 | Higher Engineering Ma | ths", B .S. Grewa | al, Khanna Publicat | tion, 2005, 39th Ed | ition. |
| | | Refer | ences | | . |
| 1 | Advanced Engineerin Publication, 1978, 1st | ng Mathematic Edition | es", Erwin Krey | vszig, Wiley Ea | stern Limited |
| 2 | Advanced Engineering Edition. | Mathematics", W | Vylie C.R., Tata M | cGraw Hill Public | ation, 1999, 8th |
| 3 | Advanced Engineering Edition | Mathematics", | H. K. Dass, S. Cł | nand & Company | Ltd., 1988, 1st |
| | | Useful | Links | | |

| 1 | https://engineering-computer-science.wright.edu https://www.classcentral.com/course/edx-introduction-to-engineering-mathematics | | | | | | | | | | | | | | |
|------------------|--|-------------|---|-----------|----------|---------|-----------|---------|---------------|----------|----------|----------|---------|---------|-------|
| 2 | | https://w | ww.cla | asscent | tral.con | n/cours | se/edx- | introd | luction-t | o-engii | neering | -mathe | ematics | | |
| 3 | | https://nj | ptel.ac. | .in/cou | rses/11 | 1/105/ | 111105 | 035/ | | | | | | | |
| 4 | | https://nj | ptel.ac. | .in/cou | rses/12 | 2/104/ | 122104 | -017/ | | | | | | | |
| | | | | CO- | PO Ma | apping | g For A | ll B.T | Гесh. Pr | ogram | IS | | | | |
| | | | | | Progr | amme | Outco | mes | (PO) | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 2 | | | | | | | | | | | | | | |
| CO2 | 2 | | | | | | | | | | | | | | |
| | - | The streng | strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High | | | | | | | | | | | | |
| | | | Assessment (for Theory Course) | | | | | | | | | | | | |
| The asses | sme | nt is base | d on 2 | in-sem | ester e | xamina | ations in | n the | form of | T1 (Tes | st-1) an | nd T2 (' | Test-2) | of 20 r | narks |
| each. Also | o the | ere shall b | e 1 En | d-Sem | examii | nation | (ESE) | of 60 | marks. 7 | [1 shall | l be typ | oically | on moo | lules 1 | and |
| 2, T2 base | ed ty | pically or | n modu | iles 3, 4 | 4 and E | ESE sh | all be o | n all 1 | nodules | with n | early 5 | 0% we | ightag | e on | |
| modules | l to 4 | 4 and 50% | 6 weig | htage c | on mod | ules 5, | 6. | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | A | ssessmen | it Plan | based | on Bl | oom's | Taxon | omy] | Level (N | (larks) | For T | heory | Cours | e | |
| В | loon | n's Taxon | omy L | Level | | | T1 | | T2 | |] | ESE | | Tota | ıl |
| 1 | | R | lemem | ber | | | 5 | | 5 | | | 20 | | 30 | |
| 2 | | U | Inderst | and | | | 10 | | 10 | | | 20 | | 40 | |
| 3 | | | Apply | y | | | 5 | | 5 | | | 20 | | 30 | |
| 4 Analyze 0 0 0 | | | | | | | | | 0 | | | | | | |
| 5 | | - | Evalua | te | | | 0 | | 0 | | | 0 | | 0 | |
| 6 Create 0 0 0 0 | | | | | | | | | | | | | | | |
| | | Tota | 1 | | | | 20 | | 20 | | | 60 | | 100 | |

| | Walchar | nd College of | Engineering, | Sangli | | | | | | | | |
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| | | overnment Ataea A AV 20 | <u>(1.1.22)</u> | l | | | | | | | | |
| | | Course In | formation | | | | | | | | | |
| Programme | | B.Tech. | | | | | | | | | | |
| Class, Semes | ter | First Year B.Te | ech., Sem I &II | | | | | | | | | |
| Course Code | 9 | | | | | | | | | | | |
| Course Nam | e | Engineering M | echanics | | | | | | | | | |
| Desired Req | uisites: | Knowledge of l | higher secondary le | vel Physics | | | | | | | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | | | | | | | | |
| Lecture | 3 Hrs/week | T1 | T2 | ESE | Total | | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
| Interaction | - | | Cre | dits: 3 | | | | | | | | |
| | | | | | | | | | | | | |
| 1 | To impart knowledge of | vivil and mechanica | al engineering. | | | | | | | | | |
| 2 | To illustrate behavior of | | | | | | | | | | | |
| 3 | To provide knowledge of applications. | ge of motions, forces and work energy principles and its er | | ngineering | | | | | | | | |
| | Course Out | my Level | | | | | | | | | | |
| CO1 | Apply laws and basic co | Understanding | | | | | | | | | | |
| CO2 | To illustrate behavior of static bodies using mechanics concepts. To provide knowledge of motions, forces and work energy principles and its engineering applications. Course Outcomes (CO) with Bloom's Taxonomy Level Apply laws and basic concepts of mechanics of rigid bodies. Analyze system of forces in Statics and Dynamics. Apply concept of mechanics to solve engineering problems. Applying Course Contents Hou Equilibrium of Forces: Fundamental concepts and axioms, Types of Force Systems, Composition and resolution of forces, Moment of a force, Couple, | | | | | | | | | | | |
| CO3 | Apply concept of mecha | | Applying | | | | | | | | | |
| Module | | Course Co | ontents | | Hours | | | | | | | |
| Ι | Systems, Composition a Resultant of planar fr diagrams, Equations Equilibriums of beams friction, equilibrium or involving wedges, ladde | and resolution of orce systems. H of equilibrium, - Types of load f bodies on inc ers etc. | forces, Moment of Equilibrium of for Equilibrium of ds and supports. lined plane, appli | f a force, Couple, rces- Free body planar systems, Friction-Laws of cations- problem | 8 | | | | | | | |
| П | Virtual work and applications to staticall of gravity and Centro Moment of inertia. | Moment of in y determinate si id, Moment of | ertia:Principle of mple and compour inertia, Radius of | Virtual work- nd beams. Centre gyration, Mass- | 6 | | | | | | | |
| III | Analysis of plane fram Assumptions, imperfect determinate trusses, m method. | nes: Pin-jointed , perfect and reduced thod of joints, | statically determina undant trusses, Ana method of section | ate plane trusses- lysis of statically ns and graphical | 6 | | | | | | | |
| IV | Kinematics of particle variable acceleration, E motion, Motion of a P between linear and angu | s: Rectilinear motion quations of motion rojectile, Curvili llar motion. | otion of a particle u ion, Motion under near motion of a | nder uniform and gravity, Relative particle, Relation | 7 | | | | | | | |
| V | Kinetics of Particles: Rectilinear motion- Me motion of connected b force, motion of a bicyce and railway curves, Ki problems on centroidal | Newton's laws otion on a roug odies, Circular le, Car along a c netics of rotatio and non centroid | of motion, D'Ale h inclined plane, motion- Centripeta urved track, super of n-Torque, mass m al rotation. | mberts principle. motion of a lift, l and centrifugal elevation of roads oment of inertia, | 7 | | | | | | | |
| VI | Kinetics : Work energy conservation of energy collision of bodies, coe impact. | y method- poter . Impulse mom fficient of restit | ntial energy, kineti entum method. Co ution, loss of kinet | c energy, law of ollisions- impact, tic energy due to | 6 | | | | | | | |

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| Course Code | | | 01 '11 | | | | | | | | | |
| Course Nam | e | Communication | n Skills | | | | | | | | | |
| Desired Requ | uisites: | Higher Seconda | ary Level | | | | | | | | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | | | | | | | | |
| Lecture | 2 Hrs/week | T1 | T2 | ESE | Total | | | | | | | |
| Tutorial | 1 Hrs/week | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
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| 1 | Inculcate the importar | unication Skills | | | | | | | | | | |
| 2 | Enhance their communi | | | | | | | | | | | |
| 3 | Enable the students to c | | | | | | | | | | | |
| 4 | Prepare the students to a | eir profession | | | | | | | | | | |
| | and enable them to acqu | | | | | | | | | | | |
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| <u>CO1</u> | and enable them to acquire proper behavioral skills Course Outcomes (CO) with Bloom's Taxonomy Level Communicate clearly, precisely and competently in different scenario Applying Demonstrate the information through oral , written and graphic messages Understandi | | | | | | | | | | | |
| <u>CO2</u> | Demonstrate the inform | ation through ora | al, written and grap | hic messages | Understanding | | | | | | | |
| CO3 | Course Outcomes (CO) with Bloom's Taxonomy LevelCommunicate clearly, precisely and competently in different scenarioApplyingDemonstrate the information through oral , written and graphic messagesUnderstandAcquire basic proficiency in English including reading and listening comprehension , writing and speaking skillsRemember | | | | | | | | | | | |
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| | Module 1: Sentence S | Structure and V | ocabulary Building | ng: Subject Verb | Hours | | | | | | | |
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| I II III IV V | Module 1: Sentence S Agreement, Modal verb and Standard abbreviation Module 2 : Fundamental Importance of Communication, Downwond Breakdown of Communication, Downwond Diagonal communication, Downwond Conclusion Module 3 : Nature and Classifying, Providing et Conclusion Module 4 : A. Non Ver Proxemics : Space Dist Vocalic : Paralinguistic words/minute B. Listening Skills:- 1. to effective Listening Module 5 : A. Oral Co Occasions (Welcome S), 2. Group Presentation 5. Job Interviews B. Basics of Phonetice Sounds in English 2, Welcom | Structure and V s, Question tags, ions, Redundance tals of Commun- ication, The Com- ication, The Com- ication, Commun- vard communication on, Informal communication I Style of Writin examples or evide to al Communication c features: 1.Pitce Process of Lister mmunication:- peech, Introduct ns 3. Group Disc s:- 1. Improper | Jocabulary Buildin Connectives, Syno ies, Misplaced Mod nication: Features a nmunication Process nication in an Orga- tion, Horizontal com- munication / Grape g : Describing, Def- lence, Writing Intro- ation : Kinesics or ronemics, Nonverb ch 2.Volume 3.Paus ning 2.Types of Liss 1. Speeches for di- tory Speech, Vote of cussions 4. Individu Pronunciation 2. Co- | ng: Subject Verb myms, Antonyms lifiers Passives. and Functions, as, Barriers and mization, Upward munication, Vpward munication, vine fining, duction and Body Language, al Barriers. ass 4. Rate of tening 3. Barriers ifferent of Thanks Speech al Presentations lassification of tonation | 5 3 3 4 5 | | | | | | | |
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| I II III IV V | Module 1: Sentence S Agreement, Modal verb and Standard abbreviation Module 2 : Fundamental Importance of Communication, Downwe Diagonal communication, Downwe Diagonal communication Module 3 : Nature and Classifying, Providing et Conclusion Module 4 : A. Non Ver Proxemics : Space Dist Vocalic : Paralinguistic words/minute B. Listening Skills:- 1. to effective Listening Module 5 : A. Oral Co Occasions (Welcome S), 2. Group Presentation 5. Job Interviews B. Basics of Phonetices Sounds in English 3. W 5. Pronunciation and A Module 6 : Writing Co A. Basic Writing Skill | Structure and V s, Question tags, ions, Redundanci tals of Commun- ication, The Con- ication, Commun- vard communication on, Informal commu- vard communication I Style of Writin examples or evid Chal Communication ance, Haptic, Ch c features: 1.Pito Process of Lister mmunication:- peech , Introduct ns 3. Group Disc s :- 1. Improper Vord Stress 4. Se rticulation ommunication s : 1.Paragraph V | Jocabulary Buildin Connectives, Syno ies, Misplaced Mod nication: Features a nmunication Process nication in an Orga tion, Horizontal com munication / Grape g : Describing, Def lence, Writing Intro ation : Kinesics or ronemics, Nonverb ch 2.Volume 3.Paus ning 2.Types of Liss 1. Speeches for di tory Speech, Vote of cussions 4. Individu Pronunciation 2. C entence Stress or In Writing 2. Compreh | ng: Subject Verb myms, Antonyms lifiers Passives. and Functions, as, Barriers and mization, Upward munication, Upward munication, vine Fining, duction and Body Language, al Barriers. ass 4. Rate of tening 3. Barriers ifferent of Thanks Speech al Presentations lassification of tonation | 5 3 4 5 | | | | | | | |

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| | 6 | 6.Importance of proper punctuations 7. Creating coherence 8.Organising the principles of paragraphs in documents 9.Techniques for writing precisely B. Business Correspondence : 1. Job Applications 2. Complaint Letters and Adjustment Letters 3. Inquiry and Order | | | | | | | | | | | | | | |
| | ľ | B. Business Correspondence : 1. Job Applications 2. Complaint Letters and Adjustment Letters 3. Inquiry and Order C. Official Correspondence : 1. Memorandums 2. Circulars 3. Notices D. Benort Writing : 1. Individual Report 2. Lab Report 3. Inspection | | | | | | | | | | | | | | |
| | A | Adjustm | ent Le | tters 3. | Inquir | y and (| Order | | | | • | | | | | |
| | 0 | C. Offic | ial Co | rrespo | ndence | e : 1. N | lemora | ndu | ms | 2. Circ | ulars 3 | 3. Noti | ces | | | |
| | Ι |).Repo | rt Wr | iting : | 1. Indiv | vidual | Report | 2.1 | Lab | Repor | t 3. Ins | pection | n | | | |
| | F | Reports | | | | 7 | | 1 | | | | | | | | |
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| 2 | 2 | Ashraf I 2006 | K1ZV1 , | Effecti | ve Tec | hnical | Comm | luni | cati | on, Ta | ta Mc | Jraw I | Hills pu | JDI1S | shing Co | ompany |
| | | | | | |] | Refere | nces | 5 | | | | | | | |
| 1 | F 2 | K.R.La: | xmina | rayana | ın, Eng | glish f | or Tec | hni | cal | Comn | nunica | tion, S | Scitech | n, Si | ixth Ed | ition, |
| 2 | V V | Villiam | Sanbo | rn Pfei | ffer ,T. | V.S. P | admaja | , <i>Te</i> | chn | ical Co | ommun | ication | n: A Pr | actio | cal App | roach, |
| | / | earson, | Drouv | CUITION | 1 2012 atia ^ | MCh | aikh D | rof | | nal C | 1111111111 | ication | Skills | 5 (| ⁷ hand a | nd Co: |
| 3 | F | Fifth edition ,2009 F.T.Wood.Remedial English Grammar, Macmillan, 2007 | | | | | | | | | | | | | | |
| 4 | F | F.T.Wood,Remedial English Grammar, Macmillan, 2007 | | | | | | | | | | | | | | |
| 5 | A A | Andrea J.Rutherford,Phd. <i>Basic Communication Skills for Technology</i> , Pearson Education Asia,2001 | | | | | | | | | | | | | | |
| 6 | I | Exercise | s in Sp | oken H | English | , Parts | 1 and I | I CI | EFI | L, Hyd | erabad | , Oxfo | ord Uni | vers | ity Pres | s |
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| 1 | v | www.ou | pinheo | nline.c | com | | | | | | | | | | | |
| 2 | v | www.sc | itechpb | licatio | ns.com | l | | | | | | | | | | |
| | | | | CO- | PO Ma | apping | g For A | II B | .Te | ch. Pr | ogram | S | | | | |
| | | | | | Progr | amme | Outco | mes | s (P | 0) | | | | | PSC |) |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | | | | | | | | 3 | | | | | |
| CO2 | | | | | | | | | | | 2 | | | | | |
| CO3 | | | | | | | | | | | 2 | | | | | |
| | Th | e streng | gth of r | nappin | ig is to | be writ | tten as | 1,2, | 3; V | Vhere, | 1:Low | , 2:Me | dium, 3 | B:Hig | gh | |
| | | | | | Asses | ssment | t (for T | heo | ory (| Course | e) | | | | | |
| The asses | sment | is base | d on 2 | in-sem | lester e | xamina | tions in | n the | e fo | rm of] | [1 (Tes | st-1) an | nd T2 (| Test- | -2) of 20 |) marks |
| each. Also | o there | shall b | e I En | d-Sem | exami | nation (| (ESE) (| of 60 | 0 m | arks. T | l shall | be typ | oncally (| $\frac{5n}{1}$ | nodules | l and |
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| B | loom' | s Taxon | omv I | | | | T1 | UII | | T2 | lai K5j | | ESE | Cou | To | tal |
| 1 | | R | emem | her | | | 10 | | | 10 | | | 24 | | | 4 |
| 2 | | U | Inderst | and | | | 10 | | | 10 | | | 36 | | 5 | 6 |
| 3 | | | Apply | / | | | 0 | | | 0 | | | 0 | | | 0 |
| 4 | | | Analyz | ze | | İ | 0 | | | 0 | | | 0 | | | 0 |
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| | Walchar | nd College of | Engineering, | Sangli | | | | | | | | |
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| | | overnment Alded A | atonomous institute, |) | | | | | | | | |
| | | Course In | formation | | | | | | | | | |
| Programme | | B.Tech. | ioi mation | | | | | | | | | |
| Class. Semes | ter | First Year B Te | ch Sem I & II | | | | | | | | | |
| Course Code | <u>, </u> | | | | | | | | | | | |
| Course Nam | e | Programming F | For Problem Solvin | <i>σ</i> . | | | | | | | | |
| Desired Reg | uisites: | Basic course of | software and hard | 8. ware programming | | | | | | | | |
| Tea | ching Scheme | | Examination | Scheme (Marks) | • | | | | | | | |
| Lecture | 2 Hrs/week | T1 | T2 | ESE | Total | | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | <u> </u> | <u> </u> | | | | | | | | |
| Interaction | - | | Cre | dits: 2 | | | | | | | | |
| | | Course O | biectives | | | | | | | | | |
| 1 | To imbibe an understan | | | | | | | | | | | |
| | To develop problem-sol | d problems into pro | ograms written | | | | | | | | | |
| 2 | using the Programming | constructs. | e | | | | | | | | | |
| 3 | To impart knowledge or | guages such as: co | nditional | | | | | | | | | |
| | branching, loops, block | out. | | | | | | | | | | |
| 601 | Course Out | omy Level | The demote will be a | | | | | | | | | |
| | Convert the algorithms | Course Outcomes (CO) with Bloom's Taxonomy Level araphrase the basics of programming Understandir onvert the algorithms to programs Understandir pply programming language principles and constructs to solve problems Applying | | | | | | | | | | |
| | A pply programming lan | Paraphrase the basics of programming Convert the algorithms to programs Apply programming language principles and constructs to solve problems | | | | | | | | | | |
| <u> </u> | Apply programming fam | Course Co | and constructs to s | solve problems | Apprying | | | | | | | |
| Module | Introduction to Progre | | ontents | | nours | | | | | | | |
| I | Introduction to comp processor, where a pr compilers etc.) Idea or problems. Representat examples. From algor variables (with data ty Logical Errors in compi | onents of a co ogram is stored f Algorithm: ste ion of Algori ithms to progr pes) variables a lation, object and | omputer system I and executed, c ps to solve logica thm: Flowchart/P ramming Languag and memory locati I executable code. | (disks, memory, pperating system, al and numerical seudocode with ge: source code, ions, Syntax and | 04 | | | | | | | |
| Ш | Arithmetic expression & Loops Arithmetic expression operators, increment an operators, assignment of expressions, precedence Loops: Statements and while and for statements | s, Precedence co s & Precedence d decrement oper operators, express e and order of ev blocks, if and s s, break, continue | : Arithmetic, relatrators, conditional sions, type conversional valuation Condition witch statements, I be, goto and labels. | tional Branching tional and logical operator, bit-wise sions, conditional nal Branching & Loops ,while, do- | 04 | | | | | | | |
| III | Arrays Arrays- concepts, dec elements, arrays and fu Strings, and application | claration, defini unctions, two-din s of arrays. | tion, accessing e mensional arrays, | elements, storing Character arrays, | 05 | | | | | | | |
| IV | Functions and Recursi Designing structured pr value, idea of call by 1 static, scope rules, bloc examples. | on ograms, Function reference, storage k structure, user | ns basics, paramete e classes like exter r defined functions | er passing, call by rn, auto, register, s, Recursion with | 04 | | | | | | | |
| V | Pointers, Structures an Pointers- concepts, initiarguments, address aritipointer. Derived types: | nd Union alization of poir hmetic, Characte structures- decl | nter variables, poin or pointers and fun aration, definition | ters and function ctions, pointer to and initialization | 05 | | | | | | | |

| | of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self-referential structures, and unions. Introduction to File handling | | | | | | | | | | | | | | |
|------------|--|-----------------|--|---------|--------------------|-------------------|-----------|-------|----------------|---------|----------|----------|--------|----------|----------|
| | | Introd | uction | to File | handli | ng | | | | | | | | | |
| VI | | Input | and out | put - c | concept | of a | file, te | xt f | iles and t | oinary | files, s | treams | , | 04 | Ļ |
| | | standa | rd I/O, F | ormatt | ed I/O, | file I/C | J opera | ation | ns, error ha | andling | • | | | | |
| | | Byron | Gottfrie | ed, Sch | aum's, | "Outli | ne of] | Prog | gramming | with (| | Graw- | Hill, | Third | edition, |
| I | | 2017. | | , | , | | | | 0 | | , | | , | | , |
| 2 | | Yasha | vant Ka | netkar, | "Let U | s C", E | BPB Pu | blic | ation, Fifte | eenth e | dition, | 2016. | | | |
| 3 | | E. Bal | agurusa | my, "P | rogram | ming i | n ANS | I C | ", Tata Mo | cGraw | Hill E | ducatio | on, Se | eventh | edition, |
| | | 2016. | | | | 1 | Dofomor | | - | | | | | | |
| | | Brian | W Kern | iohan a | and De | nnis M | Ritchi | nces | s The C Pro | oramn | ing I a | nallage | »" Pr | entice l | Hall of |
| 1 | | India. | Second | Edition | , 2015. | | | ς, | | Statin | ing Da | inguage | , 11 · | | 1411 01 |
| | | , | | | , | U | seful I | Link | KS | | | | | | |
| 1 | | http://v | tp://www.learnvern.com/course/c-tutorials/ | | | | | | | | | | | | |
| 2 | | https:// | ttps://www.udemy.com/c-programming-for-beginners/ | | | | | | | | | | | | |
| 3 | | https:// | ttps://www.geeksforgeeks.org/c-programming-language/ | | | | | | | | | | | | |
| 4 | | https:// | codefor | win.or | g/ | | | | | | | | | | |
| | | Γ | | CO- | PO M | apping | g For A | II B | B.Tech. Pr | ogram | S | | | DCO | |
| | 1 | | 2 | 4 | Progr | camme | | ome | | 10 | 11 | 12 | 1 | PSU | , 2 |
| CO1 | 1 | 2 | 5 | 4 | 5 | 0 | / | 0 | 9 | 10 | 11 | 12 | 1 | 2 | |
| C01 | 2 | $\frac{1}{2}$ 1 | | | | | | | | | | | | | |
| CO2 | 3 | $\frac{1}{2}$ | 1 | | | | | | | | | | | | _ |
| | | The stre | ngth of | mappir | ng is to | be writ | tten as | 1,2, | 3; Where, | 1:Low | , 2:Me | dium, 3 | B:Hig | h | |
| | | | 0 | | Asse | ssment | t (for T | hec | ory Cours | e) | , | , | | | |
| The asses | sme | ent is ba | sed on 2 | in-sem | nester e | xamina | ations in | n th | e form of ' | Γ1 (Tes | st-1) an | d T2 (| Test-2 | 2) of 20 | marks |
| each. Also | o th | ere shall | be 1 En | d-Sem | exami | nation | (ESE) o | of 6 | 0 marks. T | 1 shall | be typ | ically o | on mo | odules | l and |
| 2, 12 base | ed t | ypically | on mod | ules 3, | 4 and \mathbf{I} | ESE sha ulog 5 | all be o | n al | l modules | with n | early 5 | 0% we | ighta | ge on | |
| modules | 1 10 | 4 and 5 | | mage (| JII IIIOu | ules 5, | 0. | | | | | | | | |
| | A | Assessm | ent Plar | ı based | l on Bl | oom's | Taxon | om | v Level (N | larks) | For T | heory | Cour | se | |
| В | looi | m's Tax | onomy l | Level | | | T1 | | T2 | , |] | ESE | | То | tal |
| 1 | | | Remem | ber | | | | | 10 | | | 5 | | 1 | 5 |
| 2 | | | Underst | and | | | 10 | | 10 | | | 10 | | 3 | 0 |
| 3 | | | Appl | у | | | 10 | | | | | 10 | | 2 | 0 |
| 4 | | | Analy | ze | | | | | | | | 15 | | 1 | 5 |
| 5 | | | Evalua | ate | | | | | | | | 10 | | 1 | 0 |
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| | Walchan | d College of | Engineering, | Sangli | |
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| | (60 | vernment Alded Al | ntonomous Institute) N1_77 | | |
| | | Course Inf | ormation | | |
| Programme | | B.Tech. | ormation | | |
| Class, Semest | er | First Year B.Te | ch., Sem I &II | | |
| Course Code | | | , | | |
| Course Name | | Engineering Me | echanics Laborator | ۲V. | |
| Desired Requ | isites: | Engineering Me | echanics | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | |
| Lecture | _ | LAI | LA2 | Lab FSF | Total |
| Tutorial | _ | 30 | 30 | 40 | 100 |
| Practical | 2 Hrs/week | 50 | 50 | 10 | 100 |
| Interaction | | | Cre | dits: 1 | |
| Interaction | | | vicetives | | |
| 1 | To conduct the experim | ents to verify the | principles of med | hanics | |
| 2 | To execute the graphica | 1 methods to veri | fy the analytical s | alutions | |
| | Course Oute | comes (CO) with | Bloom's Taxono | my Level | |
| | Demonstrate verification | n of laws and ba | sic principles of m | echanics through | Applying |
| CO1 | experiments. | | ere principies of in | e e e e e e e e e e e e e e e e e e e | · · · · · · · · · · · · · · · · · · · |
| CO2 | Execute the experiment | ts to verify the l | aws of mechanics | analytically and | Applying |
| | graphically. | 4 of E-m onim on 4 | a / T ah A ati-ritian | | |
| | List of Exposit | t of Experiment | s / Lab Activities | wnowimonta | |
| 1 | To vorify of law of trior | ala of forces | ities- Any Eight f | Experiments | |
| 2 | To verify of law of poly | igic of forces | | | |
| 3. | Determine the support r | eactions for Sim | ply Supported Bea | m. | |
| 4. | To verify the principle of | of moments with | the help of Bell cr | ank lever apparatu | s. |
| 5. | Determine the coefficient | nt of friction for | motion on horizon | tal plane. | |
| 6. | Determine the coefficient | nt of friction for | motion on inclined | l plane. | |
| 7. | Determine efficiency of | simple screw jac | ek apparatus. | | |
| 8. | Determine efficiency of | worm and worm | wheel apparatus. | | |
| 9. | Graphical solution of sta | atically determin | ate Beams. | | |
| 10. | Graphical solution of pi | n jointed perfect | plane frames. | | |
| | Bhavikatti S S and R | aiashekaranna K | OOKS G "Engineering | Mechanics" New | Δ ge |
| 1 | International Publishers | . 2015. 5th Editio | n. | Wieemanies , wew | 1150 |
| 2 | Khurmi. R. S., "Textboo | ok of Applied Me | echanics", Tata Mo | Graw Hill Publish | ing Company, |
| 2 | 2013, 20th Revised Edit | tion. | | | |
| 3 | Ramamrutham., S. "Te | extbook of Appl | ied Mechanics", | Dhanpat Rai Publ | ishing Company |
| | Limited, 2008. | | | | |
| | Deen E. D. and Jahurtan | Refere | ences Maabaniaa fan End | vin eens Vel I en d | II? McCreary II:11 |
| 1 | Company Publication 2 | n, E. R. Vector 2011 9th Edition | Mechanics for Eng | gineers vol. I and | II, McGraw Hill |
| 2 | Singer, F. L. "Engineeri | ing Mechanics St | atics & Dynamics' | ". B. S. Publication | is. 2011. |
| | Timoshenko, S. and Yo | ung. D. H. "Eno | ineering Mechanic | s". McGraw Hill G | Companies, 2008 |
| 3 | 4th Edition. | | | - , | , <u>2000</u> , |
| | | Useful | Links | | |
| 1 | https://nptel.ac.in | | | | |
| 2 | https://www.coursera.or | rg/learn/engineer | ing-mechanics-stat | tics | |
| 3 | https://swayam.gov.in/ | | | | |
| | СО-РО | Mapping For A | All B.Tech. Progra | ams | |

| Programme Outcomes (PO) PSO 1 2 3 4 5 6 7 8 0 10 11 12 1 2 2 | | | | | | | | | | | | | | | |
|--|-------|---------------------|------------------|------------------|--------------------|---|-----------------|--------------------------|------------------|-------------------|------------------|----------------|---------------|---------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | 2 | | | 2 | | | | | | | | | | |
| CO2 | 3 | 2 | | | 2 | | | | | | | | | | |
| | T | he streng | th of n | nappin | g is to b | e writt | en as 1 | ,2,3; W | Where, | 1:Low, | 2:Med | lium, 3 | :High | | |
| | | | | | Asse | ssmen | t (for l | Lab. C | ourse) | | | | | | |
| IMP: Lab | ESI | There E is a sep | are th parate | ree co head (| mponer of passi | nts of l ng. LA | ab ass 1, LA | essmer 2 toget | nt, LA her is | l, LA2 treateo | and L d as In | ab ES Semes | E. ster Ev | aluati | on. |
| Assessme | ent | Ba | sed on | | Condu | cted b | у | Туріс | al Sch | edule (| for 26 | -week | Sem) | Μ | [arks |
| τ. λ. 1 | | Lab a | ctivitie | es, | Lab (| Course | Dı | uring W | /eek 1 | to Wee | k 6 | | | | 20 |
| LAI | | attendar | nce, jou | ırnal | Fac | culty | M | arks Su | ıbmissi | on at t | he end | of Wee | ek 6 | | 30 |
| LA2 | | Lab a | ctivitie | es, | Lab (| Course | Dı | During Week 7 to Week 12 | | | | | | | 30 |
| L// 12 | | attendar | ice, joi | ırnal | Fac | culty | M | arks Su | ıbmissi | on at t | he end | of Wee | ek 12 | | 50 |
| Lab ESI | Ę | Lab a | ctivitie | es, | Lab (| Course | Du | iring W | /eek 15 | to We | ek 18 | | | | 40 |
| XX7 1 1 . | 1. | attendar | ice, joi | irnal | Fac | aculty Marks Submission at the end of Week 18 | | | | | | | | | |
| Week I in | dicat | es startin | g week | t of a s | emester | r. The typical schedule of lab assessments is shown, considering | | | | | | | | ing a | |
| 20-week s | rform | aing over | actual | to min | i projec | shall be as per academic calendar. Lab activities/Lab per project presentations drawings programming and other | | | | | | | ther su | itabla | snan |
| activities | as ne | r the nat | ure and | l requi | rement d | ect, presentations, drawings, programming and other of the lab course. The experimental lab shall have | | | | | | | | cally 8 | -10 |
| experimer | us pe | i the nat | ure une | riequi | i ement v | a of the lab course. The experimental lab shall have | | | | | | | ve typi | curry 0 | 10 |
| - onportation | | | As | sessmo | ent Plar | ı basec | l on B | loom's | Taxor | 10my l | Level | | | | |
| B | loom | 's Taxon | omy L | evel | |] | LA1 | | LA | 2 | La | b ESE | | Tota | ıl |
| | | Remem | ıber | | | | | | | | | | | | |
| | | Underst | and | | | | 5 | | 5 | | | 10 | | 20 | |
| | | Appl | y | | | | 10 | | 10 | | | 15 | | 35 | |
| | | Analy | ze | | | 15 15 15 | | | | 15 | | 45 | | | |
| | | Evalua | ate | | | | | | | | | | | | |
| Create | | | | | | | | | | | | | | | |
| | | Tota | 1 | | | | 30 | | 30 | | | 40 | | 100 |) |

| | Walchan | d College of | Engineering, | Sangli | | | | | | | | |
|--|--|----------------------------|----------------------------|----------------------|----------------------|--|--|--|--|--|--|--|
| (Government Aided Autonomous Institute) AY 2021-22 | | | | | | | | | | | | |
| | | AY 202 | 21-22 | | | | | | | | | |
| Programme | | B.Tech. | ormation | | | | | | | | | |
| Class, Semest | er | First Year B.Te | ch., Sem I &II | | | | | | | | | |
| Course Code | | | | | | | | | | | | |
| Course Name | | Workshop Prac | tices LAB | | | | | | | | | |
| Desired Requ | isites: | NA | | | | | | | | | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | | | | | | | | |
| Lecture | - | LA1 | LA2 | Lab ESE | Total | | | | | | | |
| Tutorial | - | 30 | 30 | 40 | 100 | | | | | | | |
| Practical | 2 Hrs/week | | | | | | | | | | | |
| Interaction | - | | Cre | dits: 1 | | | | | | | | |
| | | Course Of | viectives | | | | | | | | | |
| 1 To train the students to use different tools and equipments involved in the manufacturing | | | | | | | | | | | | |
| 1 processes | | | | | | | | | | | | |
| 2 To develop the skills to handle the basic machine tools and equipments required for various | | | | | | | | | | | | |
| 2 manufacturing processes | | | | | | | | | | | | |
| 3 To prepare the students to carry out the various operations to make a finished product | | | | | | | | | | | | |
| 4 Train the students for making PCB for electronic applications | | | | | | | | | | | | |
| Course Outcomes (CO) with Bloom's Taxonomy Level | | | | | | | | | | | | |
| At the end of the course, the students will be able to, | | | | | | | | | | | | |
| CO1Describe the methods, operations and processes of manufacturingApplyCO2Summarize the simple mechanical systems, machines, equipment's, theAnalyze | | | | | | | | | | | | |
| CO2 | basic working of cutting | g tools for manufa | acturing. | pinent s, the | T mary 20 | | | | | | | |
| CO3 | CO2 Summarize the simple mechanical systems, machines, equipment s, the basic working of cutting tools for manufacturing. Analyze CO3 Use of chemical etching technique for making the PCB for electronic Evaluate | | | | | | | | | | | |
| | applications. | | | | | | | | | | | |
| | List of Function | t of Experiment | s / Lab Activities | | | | | | | | | |
| List of Export | LISU OF EXPERIM | ients/ Lad Activ | ities- Any Eight F | Experiments | | | | | | | | |
| 1 Comp | osite iob based on carpen | try fitting tin-sn | hithy welding etc | (16 Hrs) | | | | | | | | |
| 2. Comp | osite job of PCB making | based on negativ | e film making, UV | exposure, develop | pment and | | | | | | | |
| etchin | g etc. (6 Hrs.) | U | | | L . | | | | | | | |
| In case | e of mini-projects, drawin | ng, presentations | etc, write the relev | ant details of the s | ame. | | | | | | | |
| | | T4 D | I | | | | | | | | | |
| | Paghuwanghi P S "A | Course in Wor | 00KS Ishon Technology | . I" Dhannat Rai | Publications 10th | | | | | | | |
| 1 | Ed.2009 | | kshop reenhology | 7 I ,Dhanpat Kai | r ublications, i otn | | | | | | | |
| | S. K. Hajra Choudhu | ry and A. K. | HajraChoudhary," | Workshop Techn | ology" – Vol I | | | | | | | |
| 2 | [Manufacturing Process | ses]", , Media Pro | omoters and Publis | shers Pvt. Ltd., 10 | th edition, reprint | | | | | | | |
| | 2001 | D . f | | | | | | | | | | |
| | WALChanman "Wo | Refere rkshon Technolo | nces w Volume I" CP | S Publishing & Di | istributors Dalhi | | | | | | | |
| 1 | ISBN-13.9788123904(| 16] 2001 | gy volume I, CD | S I ublishing & Di | suibulois, Denn. | | | | | | | |
| 2 | Rao P.N., "Manufacturi | ng Technology", | Vol. I and Vol. II, | Tata McGrawHill | House,2017 | | | | | | | |
| 3 | Gowri P. Hariharan and | l A. Suresh Babu | ,"Manufacturing T | Technology – I" Pe | earson Education, | | | | | | | |
| 2008 | | | | | | | | | | | | |
| 1 | https://www.wlab.ac.im/ | Useful I | LINKS | | | | | | | | | |
| | http://www.viab.co.in/ | blobsma html | amcai-engineering | | | | | | | | | |
| <u>∠</u> | https://viaus.iit0.ac.in/via | $\frac{1}{1}$ | the Club5007:W | | 2007 | | | | | | | |
| 3 | https://urive.googie.com | <u>1/111e/u/11p3y v 2g</u> | <u>311/ 2020115 (1111)</u> | | <u>= w</u> | | | | | | | |
| | СО-РО | Mapping For A | II B.Tech. Progra | ams | | | | | | | | |

| | Programme Outcomes (PO) PSO 1 2 4 5 6 7 0 10 11 12 1 2 | | | | | | | | | | | | | | |
|--|---|-----------|-----------------|--------------------|-----------|--|---------------------------------|--|----------|---------|-----------------------|--------------------|----------|---------|--------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | 1 | | | | | | | | | | | |
| CO2 | | | | 1 | | | | | | | | | | | |
| CO3 | | | | | 1 | | | | | | | | | | |
| | The | e streng | th of n | happing | g is to b | e writte | en as 1 | 1,2,3; W | /here, | l:Low, | 2:Mec | lium, 3 | :High | | |
| | | | | | Asse | ssment | t (for] | Lab. C | ourse) | | | | | | |
| | | There | are th | ree cor | nponer | nts of l | ab ass | essmer | nt, LA | l, LA2 | and L | ab ES | E. | | |
| IMP: Lab | ESE | is a sep | oarate | head o | f passiı | ng. LA | 1, LA | 2 toget | her is t | treated | l as In | -Semes | ster Ev | aluati | on. |
| Assessmer | nt | Bas | sed on | | Condu | cted b | у | Typic | al Sch | edule (| for 26 | -week | Sem) | Μ | larks |
| TA1 | Lab activities,Lab CourseDuring Week 1 to Week 6attendance, journalFacultyMarks Submission at the end of Week 6 | | | | | | | | | | | | | 30 | |
| LAI | attendance, journal Faculty Marks Submission at the end of Week | | | | | | | | | | 50 | | | | |
| LA2 | | Lab a | ctivitie | es, | Lab (| Course | During Week 7 to Week 12 30 | | | | | | | 30 | |
| | 6 | attendar | <u>ice, joi</u> | ırnal | Faculty | | | Marks Submission at the end of Week 12 | | | | | | | 50 |
| Lab ESE | | Lab a | ctivitie | es, | Lab C | Course | ourse During Week 15 to Week 18 | | | | | | | 40 | |
| XX7 1 1 · 1 | | attendar | $\frac{1}{1}$ | irnal | Fac | Faculty Marks Submission at the end of Week 18 | | | | | | | • 1 | | |
| Week I ind | icates | s startin | g week | cofase | emester | $\frac{1}{1}$ I he t | ypical | schedu | le of la | b asses | ssment | S IS Sho | own, co | nsider | ing a |
| 20-week se | mesu formi | er. The a | actuars | schedul | ie snall | be as p | er aca | aemic (| | ar. Lao | | ies/Lat | b perior | mance | e snam |
| activities a | s per | the nat | | ts, mm 1 requir | ement | of the 1 | ah cou | nis, uia irse Th | e evne | riment | 111111112 21 12b c | g and o hall ha | ulei sul | cally 8 | 10 |
| experiment | s per | the nati | | i icquii | ciliciti | | | use. 11 | сехре | | ai 1a0 S | 11411 114 | ve typi | carry o | -10 |
| enperiment | 5. | | As | sessme | nt Plar | ı based | l on B | loom's | Taxor | omv I | level | | | | |
| Blo | om's | s Taxon | omv I | evel | | 1 | LA1 | | LA | 2 | La | b ESE | | Tota | al |
| | | Remem | ber | | | | | | | | | | | 1000 | •- |
| | | Underst | and | | | | | | | | | | | | |
| $\frac{\Delta n n l v}{\Delta n l v} = \frac{15}{15} = \frac{15}{20} = 56$ | | | | | | | | | | | 50 | | | | |
| | | Analy | y 70 | | | | 10 | | 10 | | | 10 | | 20 | |
| | | Erralia. | | | | | 10 2 | | 10 | | | 10 | | 30 | |
| | | Evalua | ile | | | | 3 | | 3 | | | 10 | | 20 | |
| | | Creat | <i>.</i> e | | | | • • | | | | | | | | |
| | | Tota | I | | | | 30 | | 30 | | | 40 | | 100 | |

Job Drawings [The detailed drawing of each section will be finalized after finalizing the proper dimensions of individual jobs and availability of respective job raw material]



All dimensions are in mm







| | | Walchan | d College of | Engineering, | Sangli | | | | | | |
|------|--|-----------------------------|--|---------------------------------------|-----------------------|--------------------|--|--|--|--|--|
| | | (60) | Vernmeni Aldea Au | 1000000000000000000000000000000000000 | | | | | | | |
| | | | A 1 202 | rmation | | | | | | | |
| Pro | oramme | | B Tech | n mation | | | | | | | |
| | gi annic ss. Somosta |)r | Eirst Vear B Te | ch Sem I & II | | | | | | | |
| | ss, Semesu | | Thist Teal D.Te | | | | | | | | |
| | Irse Code | | Duranting | D11 C-1 | - T - 1- | | | | | | |
| | Irse Name | •. | Programming f | or Problem Solvin | | | | | | | |
| Des | ired Requi | sites: | Basic course of | software and hard | lware programming | 2 | | | | | |
| | Teac | hing Scheme | | Examination S | Scheme (Marks) | | | | | | |
| Lec | ture | - | LA1 | LA2 | Lab ESE | Total | | | | | |
| Tut | orial | - | 30 | 30 | 40 | 100 | | | | | |
| Pra | ctical | 2 Hrs/week | | | | | | | | | |
| Inte | raction | - | | Cre | dits: 1 | | | | | | |
| | | | Course Ob | jectives | | | | | | | |
| | 1 | To impart problem-solv | ing and program | ming skills to tran | slate text described | l problems into | | | | | |
| | 1 | programs, written using | the Programmin | g language with th | he help of language | constructs. | | | | | |
| | • | To demonstrate use of c | computer languag | e constructs and p | rinciples such as: c | conditional | | | | | |
| | 2 | branching loops, block | structures, function | ons, and input/out | put for implementing | ng programs to | | | | | |
| | | solve problems. | omos (CO) with | Diam's Taxona | my Loval | | | | | | |
| | | Illustrate the use of | different Langu | age constructs at | nd principles of | Apply | | | | | |
| | CO1 | nrogramming language | using a program | ming environment | /tool | rippiy | | | | | |
| | | Implement programs | using programm | ing language in | a programming | Apply | | | | | |
| | CO2 | environment/using prog | ramming tool to | solve problems | - F88 | | | | | | |
| | CO3 | Examine a given progra | m to identify its | output | | Apply | | | | | |
| | | Lis | t of Experiments | s / Lab Activities | | | | | | | |
| | | List of Experim | ents/ Lab Activi | ities- Any Eight B | Experiments | | | | | | |
| 1. | Familiariza | ation with programming | environment IDE | (Integrated devel | opment environm | ent). | | | | | |
| 2 | Writing al | gorithms to solve problem | ns | | | | | | | | |
| 3 | Variable t | ypes and type conversion | S | | | | | | | | |
| 4 | Programs | to demonstrate different | operators and the | ir order precedenc | e | | | | | | |
| 5 | Programs | to solve simple computat | ional problems u | sing arithmetic ex | pressions e.g. simp | ble and | | | | | |
| 6 | compound | l interest | | | of and duction arrest | tion finding o | | | | | |
| 0 | Programs | minimum value | on conditional d | ranching e.g. roots | s of quadratic equa | tion, finding a | | | | | |
| 7 | Programe | to show statement block | conditional state | ment | | | | | | | |
| 8 | Programs | to show different types of | f iteration / loop | | | | | | | | |
| 9 | Implemen | tation of iterative probler | ns e.g., sum of se | eries | | | | | | | |
| 10 | Programs | to demonstrate matrix pr | oblems, string op | erations, sorting p | roblems. | | | | | | |
| 11 | Programst | o implement numerical r | nethods problems | s(Root finding, nu | merical differentiat | tion, and | | | | | |
| | numerical | integration): using array | , function and rec | cursion. | | | | | | | |
| 12 | Programs | to illustrate use of point | er with simple da | ata type (create po | ointer variable, ass | ign value, access | | | | | |
| | value and | show address using (* an | id &). | | | | | | | | |
| 13 | Programs | to solve the problems usi | ng pointers and s | structures e.g. swaj | p two numbers. | | | | | | |
| 14 | File handl | ing: Study and implemen | tation file operat | ions | | | | | | | |
| 15 | 15 Programs to demonstrate simple read and write operation on the external text file. | | | | | | | | | | |
| 16 | 6 Case study to demonstrate basic programming constructs | | | | | | | | | | |
| | 1 | Byron Cottfried Sahar | I ext Bo | DUKS | C" McCrow Lill | Third adition | | | | | |
| | 1 2 | Vashavant Vanatkar " | at Us C" DDD D | ubligation Eifteen | th adition 2016 | | | | | | |
| | L | F Balagurusamu "Dra | $\frac{1}{1000}$, $\frac{1000}{1000}$ | SI C" Toto MaC" | m culton, 2010. | Seventh adition | | | | | |
| | 3 | L. Dalagulusalliy, Prog | granning in ANS | | w-min Education, | Seventii eultioii, | | | | | |
| | | | | | | | | | | | |

| | References 1 Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Prentice Hall | | | | | | | | | | | | | | |
|---|--|-----------|-----------------|---------|--------------|-----------|----------|-------------|------------|-----------------------------|----------------|---------------------------|---------|----------|---------|
| 1 | | Brian V | V. Keri | nighan | and De | ennis M | [. Ritcl | hie, ' | 'The C I | Program | nming | Langu | age", F | Prentic | e Hall |
| 1 | | of India | , Secoi | nd Edit | tion, 20 | 15 | | | | | | | | | |
| | | | | | | Use | eful Li | inks | | | | | | | |
| 1 | | http://w | ww.lea | rnverr | n.com/c | ourse/c | -tutori | als/ | | | | | | | |
| 2 | | https://v | www.u | demy. | com/c-p | rogram | ming- | for-b | eginners | 8/ | | | | | |
| 3 | | https://v | www.g | eeksfo | rgeeks.o | org/c-pi | ogram | nming | g-langua | .ge/ | | | | | |
| 4 | | https://c | codefor | win.or | ·g/ | | | | | | | | | | |
| | | | | CO-I | PO Maj | pping I | For Al | 1 B.T | ech. Pro | ogram | S | | | | |
| | | | - | ł | Progra | amme | Outco | mes | (PO) | | - | | | PSO | - |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | | | | 3 | 2 | | | | | | | | | | |
| CO2 | | | | 3 | 2 | | | | | | | | | | |
| CO3 | | | | 3 | 2 | | | | | | | | | | |
| | Tł | e streng | th of m | apping | g is to b | e writte | en as 1 | ,2,3; | Where, | 1:Low, | 2:Mec | lium, 3 | :High | | |
| Assessment (for Lab. Course) | | | | | | | | | | | | | | | |
| There are three components of lab assessment, LA1, LA2 and Lab ESE. | | | | | | | | | | | | | | | |
| IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation. | | | | | | | | | | | | | | | |
| Assessment Based on Conducted by Typical Schedule (for 26-week Sem) Marks | | | | | | | | | | | | | | | |
| LA1 | | Lab a | ctivitie | es, | Lab (| Course | Du | iring | Week 1 | to Wee | ek 6 | | 1 6 | | 30 |
| | | attendar | <u>1ce, joi</u> | ırnal | Fac | culty | Ma | arks : · | Submiss | 10n at t | he end | of Wee | ek 6 | | |
| LA2 | | Lab a | | es, | Lab (| Jourse | | aring | Week / | to Wee | K 12 ha and | ofWa | 1.10 | | 30 |
| | | Labo | ice, joi | irnai | Fac Lob (| | | arks | Weelt 1 | $\frac{1011}{5}$ to W_{c} | $\frac{1}{2}$ | of wee | SK 12 | | |
| Lab ESE | , | attenda | icuviue | rnal | Fac | culty | | arks 1 | Submiss | ion at t | he end | of Wee | -k 18 | | 40 |
| Week 1 ind | icate | s startin | g week | ofas | emester | The ty | vnical s | schee | fule of la | b asse | ssment | $\frac{01}{100}$ s is sho | wn.co | nsider | ing a |
| 26-week se | mes | er. The a | actual s | chedu | le shall | be as p | er acad | demi | c calenda | ar. Lab | activit | ies/Lat | perfo | rmance | e shall |
| include per | form | ing expe | eriment | ts, min | i-projec | t, prese | entation | ns, di | rawings, | progra | mming | g and of | ther su | itable | |
| activities, a | s pe | the nati | ure and | requir | rement of | of the la | ab cou | rse. 7 | The expe | riment | al lab s | hall ha | ve typi | ically 8 | 8-10 |
| experiment | s. | | | | | | | | | | | | | | |
| | | | Ass | sessme | ent Plar | based | on Bl | loom | 's Taxoi | nomy I | Level | | | | |
| Ble | oom | 's Taxon | omy L | evel | | Ι | LA1 | | LA | 2 | La | b ESE | | Tota | al |
| | Remember 5 5 | | | | | | | | | | | | | | |
| | | Underst | and | | | | | | | | | 5 | | 5 | |
| | | Appl | y | | | | 20 | | | | | 10 | | 30 | |
| | | Analy | ze | | | | | | 10 | | | 5 | | 15 | |
| | | Evalua | ite | | | | 10 | | | | | 5 | | 15 | |
| | | Creat | e | | | | | | 20 | | | 10 | | 30 | |
| | | Tota | 1 | | | | 30 | | 30 | | | 40 | | 10 |) |
| | | | | | | | | | | | 1 | | | | |

| | Walcha | and College of | Engineering, | Sangli | |
|---------------|------------------------|----------------------|-----------------------------------|------------------------|----------------|
| | (| Government Alded Al | itonomous Institute) 1–22 | | |
| | | Course Inf | ormation | | |
| Programme | | B.Tech. | ormation | | |
| Class, Semest | er | First Year B.Tech | Sem I &II | | |
| Course Code | | | ., | | |
| Course Name | | Engineering Physi | cs Lab. | | |
| Desired Requ | isites: | Students are expect | ted to know the ba | asic practical know | ledge upto HSC |
| Teach | ning Scheme | I | Examination So | cheme (Marks) | |
| Lecture | - | LA1 | LA2 | Lab ESE | Total |
| Tutorial | - | 30 | 30 | 40 | 100 |
| Practical | 2 Hrs/week | | | | |
| Interaction | - | | Cred | its: 1 | |
| | | Course Ol | ojectives | | |
| 1 | To gain practical ki | nowledge by apply | ing the experime | ental methods to c | correlate with |
| I | the physics theory. | | | | |
| 2 | To learn the usage | of electrical and op | ptical systems for | r various measure | ements. |
| 3 | To Apply the analy | tical techniques ar | nd graphical anal | ysis to the experiment | mental data. |
| | Course O | utcomes (CO) with | Bloom's Taxono | my Level | |
| | Calculate the diame | eter of the thin wi | re, wavelength of | f light, Planck's | |
| | constant, values of | f e/m of an electr | on, Specific rot | ation of optical | |
| CO1 | active substances. | Demonstrate Hart | ley and Colpitt's | oscillator with | Applying |
| | their simulations, | Newton's ring | , and I-V cha | aracteristics of | |
| | semiconductor dioc | le. Kundt's tube. | | | |
| | List of Ermor | list of Experiments | S / Lab Activities. | | |
| 1 | List of Exper | f the thin arise has | ities- Any Eight F | | |
| 1 | Find the diameter of | of the thin wire by | diffraction of the | ingnt | |
| 2 | Determination of w | avelength of fight | by plane diffact | lon grating. | |
| 3 | Eind the wevelengt | h of Ha Na Lagar | gai solution using Plana diffr | action grating | |
| 5 | Find the e/m for the | a cathoda rays | using Flane units | action grating. | |
| 6 | Verify the expression | on for the resolvin | a power of a tele | scone | |
| 7 | Measure the wavele | ength of ultrasonic | waves by Kund | t's tube method | |
| 8 | Design and simulat | e Colnitt's & Hart | lev Oscillator | t s tube method. | |
| 9 | Determine the Plan | ck's constant | icy Oseinator. | | |
| 10 | Find the wavelengt | h and velocity of i | ultrasonic waves | in liquid | |
| 10 | Study the I-V chara | cteristic of semico | onductor diode | in nquiu. | |
| 12 | Newton's ring: Det | ermination of way | elength of light a | and refractive ind | ex of liquid. |
| | . | Text B | ooks | | |
| 1 | C. L. Arora "Practic | al Physics" S. Char | d & Co Edition 20 |)09. | |
| 2 | P.R. Sasi Kumar "Pr | actical Physics", P | HI Learning Pvt.L | td 1st edition 2011. | |
| | | Refere | ences | | |
| 1 | Halliday, Resnic and | Walker, "Fundame | entals of Physics", | John Wiley, 9th ed | ition 2011. |
| 2 | A. Beiser, "Concepts | s of Modern Physics | ", McGraw Hill Ir | nternational, 5th ed | ition, 2003. |
| 3 | Ajoy Ghatak, "Optics | s", Tata McGraw Hi | ll 5th edition, 2012 | 2. | |
| | | Useful | Links | | |
| 1 | https://nptel.ac.in/c | ourses/115/105/11 | 5105121/ | | |
| 2 | https://www.iitg.ac | .in/cet/nptel.html | | | |
| 3 | http://nptel.ac.in/vio | deo.php?subjectId | =117106091 | | |

| | CO-PO Mapping For All B.Tech. Programs Programme Outcomes (PO) PSO | | | | | | | | | | | | | | |
|--|--|---------------------|--------------|------------------|---------------------|---|-----------------|------------------|--------------------|-------------------|------------------|----------------|---------------|---------|---------|
| | | | | | Progra | amme | Outco | mes (l | PO) | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 1 | 1 | | | | | | | | | | | | | |
| | Th | ne streng | th of n | nappin | g is to b | e writt | en as 1 | ,2,3; V | Where, | 1:Low, | 2:Mec | lium, 3 | :High | | |
| | | | | | Asse | ssment | t (for l | Lab. C | course) | | | | | | |
| IMP: Lab | ESE | There E is a sep | are th | ree co head o | mponer of passii | nts of lang. LA | ab ass 1, LA | essme 2 toget | nt, LA: ther is | l, LA2 treateo | and L l as In | ab ES -Seme | E. ster Ev | aluati | on. |
| Assessme | nt | Bas | sed on | | Condu | cted b | y | Туріс | al Sch | edule (| for 26 | -week | Sem) | Ν | larks |
| т а 1 | | Lab a | ctivitie | es, | Lab (| Course | Dı | iring V | Veek 1 | to Wee | k 6 | | | | 20 |
| LAI | | attendar | nce, jou | ırnal | Fac | culty | M | arks Si | ubmissi | on at t | he end | of Wee | ek 6 | | 30 |
| LA2 Lab activities, Lab Course During Week 7 to Week 12 | | | | | | | | | | | | 20 | | | |
| LA2 attendance, journal Faculty Marks Submission at the end of Week 12 | | | | | | | | | | | | 30 | | | |
| Lab ESE Lab activities, Lab Course During Week 15 to Week 18 | | | | | | | | | | | | 40 | | | |
| | 1 | attendar | ice, jou | ırnal | Fac | aculty Marks Submission at the end of Week 18 | | | | | | | | .1 . | |
| Week 1 in | dicate | es startin | g week | c of a s | emester | : The t | ypical | schedu | ile of la | ib asse | ssment | s is sho | own, co | onsider | ing a |
| 26-week s | emes | ter. The a | actual s | schedu | le shall | be as p | er aca | demic | calenda | ar. Lab | activit | ies/Lat | perfo | rmance | e shall |
| include pe | rform | ung expe | erimen | ts, min | 1-projec | t, pres | entatio | ns, dra | iwings, | progra | imming | g and o | ther su | itable | 10 |
| activities, | as pe | r the nati | ure and | i requi | rement | of the I | ab cou | rse. 11 | ie expe | riment | ai iab s | nall na | ive typi | cally 8 | -10 |
| experimen | us. | | Ac | socom | ont Dlar | hosod | l on P | loom' | Taxor | omy l | ovol | | | | |
| D | loom | a Taxon | AS | ovol | ciit i iai | | | | ТАЛ ТА | וטוווע ו ז | | L | | Tote | .1 |
| D | 00111 | S Taxon | omy L bor | level | | 1 | 10 | | LA. | 2 | La | 15 | | 1012 | 11 |
| | | TI. 1. | | | | | 10 | | 10 | | | 13 | | 20 | |
| Understand 10 10 10 | | | | | | | | | | 30 | | | | | |
| | | Apply | у | | | | 10 | | 10 | | | 15 | | 35 | |
| | | Analyz | ze | | | | 0 | | 0 | | | 0 | | 0 | |
| | | Evalua | ite | | | | 0 | | 0 | | | 0 | | 0 | |
| Create 0 0 0 0 | | | | | | | | | | | | | | | |
| | | Tota | 1 | | | | 30 | | 30 | | | 40 | | 100 | |

| | Walchar | nd College of | Engineering, | Sangli | | | | | | | |
|--------------|--|----------------------------------|--------------------------------------|---------------------|----------------|--|--|--|--|--|--|
| | | overnment Aldea A AV 20 | <u>atonomous Institute</u> 191-99 |) | | | | | | | |
| | | Course In | formation | | | | | | | | |
| Programme | | B.Tech. | | | | | | | | | |
| Class, Semes | ter | First Year B.Te | ch., Sem I &II | | | | | | | | |
| Course Code | 2 | | | | | | | | | | |
| Course Nam | e | Engineering Ch | nemistry | | | | | | | | |
| Desired Req | uisites: | Chemistry cour | se at secondary and | d higher secondary | level | | | | | | |
| Tea | ching Scheme | | Examination | Scheme (Marks) | | | | | | | |
| Lecture | 3 Hrs/week | T1 | T2 | ESE | Total | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | |
| Practical | - | | I | L | | | | | | | |
| Interaction | - | | Cre | dits: 3 | | | | | | | |
| | | Course O | bjectives | | | | | | | | |
| 1 | To make student fami | liar with engine | ering properties a | associated with di | fferent | | | | | | |
| 1 | materials to use them | successfully in | practice. | | | | | | | | |
| 2 | To provide knowledge | e and significan | ce of characteriza | ation and chemica | l analysis for | | | | | | |
| 2 | using materials in diff | erent engineerin | ng applications. | | | | | | | | |
| | Course Out | comes (CO) wit | h Bloom's Taxono | omy Level | | | | | | | |
| | Explain chemical ana | lysis, thermal | analysis, water c | hemistry, phase | | | | | | | |
| CO1 | rule. Types of polyn | ners and its ap | plication and w | ater's industrial | Understanding | | | | | | |
| | applications. Draw s | chematic of w | ater softeners, p | ohase diagrams, | 0 | | | | | | |
| | Classify types of aba | meter and fuel c | bord water poly | more fuel fuel | | | | | | | |
| CO2 | applications. Draw schematic of water softeners, phase diagrams, Thermo grams, calorimeter and fuel cells setups. Classify types of chemical analysis, hard water, polymers, fuel, fuel understanding Classify types of chemical analysis. | | | | | | | | | | |
| C03 | Thermo grams, calorimeter and fuel cells setups. Image: Classify types of chemical analysis, hard water, polymers, fuel, fuel cells and thermal analysis. Image: Understanding cells and thermal analysis. Calculate concentration of solutions, % or GF of analyte Applying | | | | | | | | | | |
| 000 | gravimetrically, hardn | ess of water, Ca | alorific values | | | | | | | | |
| Module | | Course Co | ontents | 1 • T | Hours | | | | | | |
| | Advantages and Disa | dvantages of i | ysis - Chemical ai | nalysis, its types, | | | | | | | |
| т | methods, Different way | ys to express co | oncentration of sol | ution. Numerical | 0 | | | | | | |
| 1 | problems. Standards an | d its types. Titri | metric analysis, D | efinition of terms | 8 | | | | | | |
| | associated with titrime | ry. Classificatio | n of titrimetry, G | ravimetry and its | | | | | | | |
| | requirements, application | ns. | Turneton Turneto | in notices 1 (- | | | | | | | |
| | Water Chemistry - Na Water quality parameter | atural sources of | finition Causes T | in natural water. | | | | | | | |
| | hardness, units to me | asure hardness. | Numerical proble | ems on hardness | _ | | | | | | |
| 11 | calculation, ill effects | of hard water i | n steam generatio | on, Ion exchange | 5 | | | | | | |
| | method of water softe | ening, Dissolved | l oxygen(DO), Bi | ological Oxygen | | | | | | | |
| | Demand (BOD) and Ch | emical Oxygen E | Demand (COD) its | significance. | | | | | | | |
| | Phase Rule: Gibbs pha | se rule, Explanat | ton of the terms Pl | hase, Component, | | | | | | | |
| Ш | conditions One compo | nase leachons, ment system- W | ater system Suln | hur system Two | 6 | | | | | | |
| | component system- Le | ad Silver system | n, Application of | Eutectic system, | 0 | | | | | | |
| | Merit and Demerits of F | hase rule. | , II | , | | | | | | | |
| | Polymers- Polymer, Po | lymerization read | ctions – Addition, | Condensation and | | | | | | | |
| | Co polymerization. | Comparison | of addition an | d condensation | | | | | | | |
| 137 | polymerization and po | lymers, Plastics | and its types- T | hermoplastic and | 7 | | | | | | |
| IV | plastics Properties and | Uses of Poly Vir | vi Chloride (PVC) | Bakelite Froxy | / | | | | | | |
| | resin, Fiber Reinforced | Plastic (FRP). | Rubber and prop | erties of Rubber. | | | | | | | |
| | vulcanization of natural | rubber. | | | | | | | | | |
| V | Thermal Analysis – | Thermal analys | is and its types, | Thermal events, | | | | | | | |

| | Thermal analysis methods Thermo gravimetric Analysis (TGA), Differential 6 | | | | | | | | | | | | | | | |
|------------|---|--|-----------------|-------------------|----------|----------|----------------------|---------------|--------------|---------------------|---------|-----------------------------|-----------------|--------|------------|----------|
| | Thermal analysis methods Thermo gravimetric Analysis (TGA), Differential 6 Thermal Analysis (DTA)and Differential Scanning Calorimetry (DSC) w.r.t. 6 Principle, instrumentation, and applications, Interpretation of Thermogram 6 Energy Science: Fuel and its classification, Characteristics of good fuel, 6 Properties of solid, liquid and gaseous fuels. Calorific value, Gross and net 6 calorific value, its units, and determination by bomb and Boys calorimeter, 6 Numerical problems on calorific value. Fuel cell, its types and applications. 6 | | | | | | | | | | | | | | | |
| | | nermai | Analy | SIS (D. umenta | IA)and | nd appl | lication | Scal | nnin nter | ig Calo pretatio | on of T | y (DSC ^{Thermo} |) W.F.l gram | • | | |
| | F | nergy | Science | re: Fue | el and | its cla | ssificat | ion | Cł | aracte | ristics | of goo | nd fuel | | | |
| | P | ropertie | es of s | olid. li | ouid ar | nd gase | ous fu | els. | Cal | orific | value. | Gross | and ne | , t | | |
| VI | c | alorific | value, | its un | its, and | l deter | minatic | n b | y b | omb ai | nd Boy | s calor | rimeter | , | ϵ | 5 |
| | N | lumeric | al prob | olems o | on calo | rific va | lue. Fu | el c | ell, | its type | es and | applica | ations. | · | | |
| | | | | | |] | Fext Bo | ooks | S | | | | | | | |
| 1 | S | .K. Sin | gh, "E | nginee | ring Ch | emistr | y", Nev | NА | ge I | Publica | tion, 3 | rd Editi | on , 20 | 05. | | |
| 2 | S | hasi Cł | nawla, | "Engin | eering | Chemi | stry", I | Dha | npa | t Rai P | ublicat | ion, 3r | d Editi | on, | 2003. | |
| 3 | Ja 2 | ain P.C 013 | . and . | Jain M | onika, | "Engir | neering | Ch | emi | stry", | Dhanp | at Rai | Public | atio | n, 16th | Edition, |
| | | | | | |] | Refere | nces | 5 | | | | | | | |
| 1 | C |) G Pal | lanna, | "Engi | neerin | g Chei | nistry' | ' Ta | ata] | McGra | aw Hil | 1 2009 |). | | | |
| 2 | Ν | lendha | m, R.C | C. Den | ney, J | .D. Ba | rnes, 1 | M.J. | K (| Thoma | s, "Qu | antitat | ive Ch | emi | cal ana | lysis", |
| Z | V | 'ogel's | Pearso | n Educ | cation, | 6th Edi | ition, 2 | 2008 | 3. | | | | | | | - |
| 3 | S | .S Dara | ı, "Eng | ineerir | ng Chei | nistry" | S. Cha | and | and | Comp | any 20 | 08. | | | | |
| 4 | A E | skeland | d and 1 2003 | Phule , | "The | Science | e and E | Engi | nee | ring of | Mater | rials" T | Thomso | n P | ublicati | on 4th |
| | | , | | | | U | seful I | _ink | KS | | | | | | | |
| | h | https://edu.rsc.org/resources | | | | | | | | | | | | | | |
| 1 | A | A free resource for Chemistry teachers and students of all levels, including higher education, | | | | | | | | | | | | | | |
| | h | hosted by Royal Society of Chemistry. | | | | | | | | | | | | | | |
| 2 | h | https://www.digimat.in/nptel/courses/video/122106028/L01.html | | | | | | | | | | | | | | |
| 3 | h | ttps://or | nlineco | ourses. | nptel.ac | c.in/noo | c21_cy | 49/ŗ | prev | view | | | | | | |
| 4 | h | ttps://w | ww.co | oursera | .org/bro | owse/p | hysical | -sci | enc | e-and-e | engine | ering/c | hemist | ſy | | |
| | | | | CO- | PO Ma | apping | For A | II B | B.Te | ch. Pr | ogram | S | | | | |
| | | | | 1 | Progr | amme | Outco | mes | s (P | O) | | | | r | PSC |) |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 2 | | | | | | | | | | | | | | | |
| CO2 | 2 | | | | | | | | | | | | | | | |
| CO3 | 2 | | | | | | | | | | | | | | | |
| | Th | e streng | gth of 1 | nappin | g is to | be writ | ten as | 1,2, | 3; V | Vhere, | 1:Low | , 2:Me | dium, 3 | B:Hi | gh | |
| | | | | | Asses | ssment | (for T | heo | ory | Course | e) | | | | | |
| The asses | sment | is base | d on 2 | in-sem | ester e | xamina | tions in | n the | e fo | rm of] | [1 (Tes | st-1) an | id T2 (' | Fest. | -2) of 20 | 0 marks |
| each. Also | $\frac{1}{1}$ there | shall b | e I En | d-Sem | examii | nation (| (ESE) | $\frac{1}{2}$ | 0 m | arks. 1 | l shall | be typ | oncally (| n n | nodules | l and |
| 2, 12 base | to 4 | cally of $raised 500$ | n moai | lles 3, 4 | 4 and E | USE Sha | $\frac{11}{6}$ be of | n ai | 1 me | odules | with h | early 5 | 0% we | ignt | age on | |
| modules | 1042 | ind 307 | o weig | mage (| on mou | ules 5, | 0. | | | | | | | | | |
| | Ass | ossmon | t Dlan | hasad | on Pl | om's | Toyon | oma | . I a | vol (M | [orlze) | For T | hoory | Cou | reo | |
| R | 00m's | Taxon | omv I | evel | | 50m 3 | T1 | Jun | | T? | lai ASJ | | ESE | Cou | Т | otal |
| 1 | | Benember662032 | | | | | | | | | | | | | | |
| 2 | | Understand 8 8 25 41 | | | | | | | | | | | | | | |
| 3 | | | Apply | y | | | 6 | | | 6 | | | 15 | | 4 | 27 |
| 4 | | | Analyz | ze | | | 0 | | | 0 | | | 0 | | | 0 |
| 5 | | | Evalua | te | | | 0 | | | 0 | | | 0 | | | 0 |
| 6 | | | Creat | e | | | 0 | | | 0 | | | 0 | | | 0 |
| | • • • • • • • • • • • • • • • • • • • | Tota | 1 | | | | 20 | | | 20 | | | 60 | | 1 | 00 |

| | Walchar | nd College of | f Engineering, | Sangli | | | | | | | | |
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| (Government Aided Autonomous Institute) AY 2021-22 | | | | | | | | | | | | |
| | | | J21-22 | | | | | | | | | |
| Programme | | B Tech | | | | | | | | | | |
| Class Semes | ter | First Year B Te | ech Sem II | | | | | | | | | |
| Course Code | | That I car D. I c | eni., Beni h | | | | | | | | | |
| Course Nam | <u>е</u> | Engineering M | athematics_ II | | | | | | | | | |
| Desired Reg | nisitos. | Students are ex | nected to know the | basic concept in M | lathematics | | | | | | | |
| Tea | ching Scheme | Students are ex | Examination S | Scheme (Marks) | latienaties. | | | | | | | |
| Lootumo | 2 Hrs/wook | T1 | Т | ESE | Total | | | | | | | |
| Lecture | 5 HIS/week | 11 | 12 | ESE | 100 | | | | | | | |
| Tutorial | IHrs/week | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
| Interaction | - | | Cre | dits: 4 | | | | | | | | |
| | Course Objectives | | | | | | | | | | | |
| 1 | To develop mathemat | ical skills and e | nhance thinking p | ower of students | | | | | | | | |
| 2 | To introduce fundament | ital concepts of | mathematics and t | heir applications in | n engineering | | | | | | | |
| | fields | | | | | | | | | | | |
| | Course Out | comes (CO) wit | h Bloom's Taxono | omy Level | | | | | | | | |
| <u>CO1</u> | Illustrating mathematica | l concepts in eng | gineering field. | | Understanding | | | | | | | |
| CO2 | Use mathematical and | d computationa | l methods to sol | ve problems in | Applying | | | | | | | |
| Madula | science and engineering | g field | ntonta | | Uoung | | | | | | | |
| Module | Reta-Gamma Functio | ns. Definition | of Beta Gamm | a functions and | nours | | | | | | | |
| Ι | properties of Beta Gam | na functions. | of Deta, Gamma | a functions and | 5 | | | | | | | |
| | Multivariable Calculu | s: Multiple Inte | grals: Double inte | egrals, change of | | | | | | | | |
| П | order of integration, ch | ange of variable | s (Cartesian to pol | ar) Evaluation of | 10 | | | | | | | |
| 11 | triple integrals, Applica | tion of Multiple | integrals such as A | Area enclosed by | 10 | | | | | | | |
| | plane curves, Mass of la | mina, Volume of | f solid. | e e• 4 1 | | | | | | | | |
| | Numerical Solution of | t Ordinary Diff | terential Equation | thed (ii) Taylor's | | | | | | | | |
| III | series method (iii) Eule | r's method (iv) N | Modified Euler's m | ethod (v) Runge- | 6 | | | | | | | |
| | Kutta fourth order meth | od. | | tetiloa (v) italige | | | | | | | | |
| IV | Probability theory: 1 | ntroduction, Sa | mple Space, Eve | ents, Axioms of | C | | | | | | | |
| 1 V | probability, Conditional | probability Baye | e's Theorem | | 0 | | | | | | | |
| V | Statistics: Correlation, 1 | Regression, Curv | ve-fitting. | | 6 | | | | | | | |
| VI | Probability Distribution | on: Random Vari | iable, Binomial dis | tribution, Poisson | 7 | | | | | | | |
| | distribution, Normal dis | tribution. | Doola | | | | | | | | | |
| 1 | A Text Book of Applied | Mathematics V | ol Land II" P N a | and I N Wartikar | | | | | | | | |
| 2 | Higher Engineering Ma | ths" B.S. Grewa | al Khanna Publicat | ion 2005 39th Ed | ition | | | | | | | |
| 3 | Fundamentals of Mathe | matical Statistics | and probability S. | C. Gupta 2014 .S. (| Chand &Sons | | | | | | | |
| | | Refer | ences | <u>er eupa 2011</u> ,211 | | | | | | | | |
| 1 | Advanced Engineering | g Mathematics" | ', Erwin Kreyszig | , Wiley Eastern 1 | st edition 1978 | | | | | | | |
| 2 | Advanced Engineering | Mathematics", W | ylie C.R., Tata Mc | Graw Hill 1999, 81 | h Edition. | | | | | | | |
| 3 Advanced Engineering Mathematics", H. K. Dass, S. Chand ,1988, 1st Edition | | | | | | | | | | | | |
| 4 | Engineering Mathematic | $cs \overline{(VolI)}, S.S$ | . Sastry, Prentice H | all Publication, 20 | 06, 3rd Edition. | | | | | | | |
| Useful Links | | | | | | | | | | | | |
| 1 | https://engineering-com | puter-science.wr | ight.edu | | | | | | | | | |
| 2 | https://www.classcentra | l.com/course/edx | x-introduction-to-er | ngineering-mathem | atics | | | | | | | |
| 3 | https://nptel.ac.in/course | es/111/105/11110 | 05035/ | | | | | | | | | |
| 4 | https://nptel.ac.in/course | es/122/104/12210 | 04017/ | | | | | | | | | |
| | CO-PO | O Mapping For | All B. Tech. Progr | ams | | | | | | | | |

| | Programme Outcomes (PO) PSO 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 CO1 2 1 1 1 1 1 1 2 3 3 CO1 2 1 1 1 1 1 1 2 3 CO2 2 1 | | | | | | | | | | | | | | |
|-----------|--|-----------|---------------------|--------|----------|----------|----------|----------|---------|----------|----------|---------|---------|----------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 2 | | | | | | | | | | | | | | |
| CO2 | 2 | | | | | | | | | | | | | | |
| | Т | he stren | gth of 1 | nappin | g is to | be writ | ten as | 1,2,3; \ | Where, | 1:Low | , 2:Mee | lium, 3 | 3:High | • | |
| | | | | | Asses | sment | (for T | heory | Cours | e) | | | | | |
| The asses | smen | t is base | d on $\overline{2}$ | in-sem | ester ez | kamina | tions in | the fo | rm of [| Γ1 (Tes | st-1) an | d T2 (| Test-2) | of 20 r | narks |
| each. Als | o ther | e shall b | e 1 En | d-Sem | examir | nation (| (ESE) o | of 60 m | arks. T | '1 shall | be typ | ically | on mod | lules 1 | and |
| 2, T2 bas | T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on | | | | | | | | | | | | | | |
| modules | nodules 1 to 4 and 50% weightage on modules 5, 6. | | | | | | | | | | | | | | |
| | | | U | | | | | | | | | | | | |
| | As | sessmei | nt Plan | based | on Blo | om's ' | Taxon | omy L | evel (N | larks) | For T | heory | Course |) | |
| B | loom | 's Taxor | 10my I | Level | | | T1 | | T2 | |] | ESE | | Tota | ıl |
| 1 | | F | Remem | ber | | | 5 | | 5 | | | 20 | | 30 | |
| 2 | | U | Jnderst | and | | | 10 | | 10 | | | 20 | | 40 | |
| 3 | | | Apply | y | | | 5 | | 5 | | | 20 | | 30 | |
| 4 | | | Analyz | ze | | | 0 | | 0 | | | 0 | | 0 | |
| 5 | | | Evalua | te | | | 0 | | 0 | | | 0 | | 0 | |
| 6 | | | Creat | e | | | 0 | | 0 | | | 0 | | 0 | |
| | | Tota | ıl 📃 | | | | 20 | | 20 | | | 60 | | 100 |) |

| | Walchar | nd College of | Engineering, | Sangli | | | | | | | | |
|--------------|--|--|--|--|----------------|--|--|--|--|--|--|--|
| | | | 21-22 | 1 | | | | | | | | |
| | | Course In | formation | | | | | | | | | |
| Programme | | B.Tech. | | | | | | | | | | |
| Class, Semes | ter | First Year B.Te | ech., Sem I &II | | | | | | | | | |
| Course Code | | | | | | | | | | | | |
| Course Nam | e | Engineering Gr | aphics and AutoCA | AD | | | | | | | | |
| Desired Requ | uisites: | Basic Knowled | ge of Different Typ | bes of Curves | | | | | | | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | | | | | | | | |
| Lecture | 2 Hrs/week | T1 | T2 | ESE | Total | | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
| Interaction | - | | Cre | dits: 2 | | | | | | | | |
| | | Course O | bjectives | | | | | | | | | |
| 1 | Introduce students to the conventions, concepts and basic principles of Engineering Drawing. Draw projections of geometrical objects and real life components. Demonstrate graphics skill for communication of concepts, ideas and design of engineering | | | | | | | | | | | |
| 2 | Draw projections of geo | metrical objects | and real life compo | onents. | | | | | | | | |
| 3 | Demonstrate graphics skill for communication of concepts, ideas and design of engineering products Course Outcomes (CO) with Bloom's Taxonomy Level Understanding Principles of Engineering and Computer Graphics Understanding | | | | | | | | | | | |
| | Course Outcomes (CO) with Bloom's Taxonomy Level Understanding Principles of Engineering and Computer Graphics Understanding | | | | | | | | | | | |
| CO1 | Understanding Principle | es of Engineering | g and Computer Gra | aphics | Understanding | | | | | | | |
| CO2 | Outline projection of en | gineering objects | 5 | | Understandinge | | | | | | | |
| CO3 | Demonstrating Principle | Course Outcomes (CO) with Bloom's Taxonomy Level Inderstanding Principles of Engineering and Computer Graphics Understanding utline projection of engineering objects Understandinge emonstrating Principles of Engineering, Computer Graphics through Demonstrating rafting software Course Contents Hours troduction to Engineering Drawing Tinciples of Engineering Graphics and their significance, usage of Drawing 4 | | | | | | | | | | |
| Module | diating software | Inderstanding Principles of Engineering and Computer Graphics Understanding utline projection of engineering objects Understandinge emonstrating Principles of Engineering, Computer Graphics through Demonstrating rafting software Demonstrating Course Contents Hours throduction to Engineering Drawing cinciples of Engineering Graphics and their significance, usage of Drawing struments lettering Conic sections including the Rectangular Hyperbola | | | | | | | | | | |
| Ι | Introduction to Engine Principles of Engineerin instruments, lettering, C (General method only) Scales – Plain, Diagona Problems from the abov | eering Drawing ng Graphics and t Conic sections in b; Cycloid, Epic l and Vernier Sca we units should a | their significance, u acluding the Rectan ycloid, Hypocyclo ales; also be practiced on | usage of Drawing ngular Hyperbola id and Involute; n computer aided | 4 | | | | | | | |
| Π | Orthographic Projecti Principles of Orthograp and lines inclined to b Auxiliary Planes; Problems from the above drafting software | ons ohic Projections- oth planes; Proj ve units should a | Conventions - Proj ections of planes ilso be practiced of | ections of Points inclined Planes - n computer aided | 5 | | | | | | | |
| III IV | Infanting softwareProjections of Regular SolidsSections and Sectional Views of Right Angular SolidsInclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)4Problems from the above units should also be practiced on computer aided drafting software4Isometric Projections Principles of Isometric Views of lines, Planes, Simple and compound Solids: Conversion of Isometric Views to Orthographic Views and Vice-4 | | | | | | | | | | | |

| | I | Problem | s from | the at | ove un | its sho | ould als | so be p | ractice | d on co | ompute | r aideo | 1 | | |
|-----------|---|--|----------|--------------|---------------------|----------|----------------|----------------------|-----------|------------------|----------------|----------|---------|-----------|---------|
| | 1 | iraiting Introdu | soltwa | re o Com | nuter | Aided | Sketch | ino | | | | | | | |
| | 1 | Introduc | tion. | Drawir | ng Ins | trumen | its and | their | uses | BIS | conve | entions | | | |
| | I | Lettering | g, Dim | ension | ing and | free l | hand pi | acticin | g. Con | puter | screen, | layou | t | | |
| | 0 | of the so | oftware | , stand | ard too | l bar/n | nenus a | and des | cription | n of m | ost con | nmonly | 7 | | |
| | ι | used too | ol bars, | naviga | ational | tools. (| Co-ord | inate sy | ystem a | and ref | erence | planes | | | |
| V | 0 | of HP, V | P, RPI | P & LP | P. of 2 | D/3D e | environ | ment. S | Selection | on of d | rawing | size | | 5 | |
| | 8 | and scal | e. Com | mands | and cr | reation | of Lin | es, Co- | ordina | te poin | ts, axes | s, poly | - | 5 | |
| | 1 | ines, sq | uare, r | ectangl | le, poly | gons, | splines | , circle | s, ellip | se, text | , move | , copy | , | | |
| | (| off-set, 1 | mirror, | rotate, | trim, e | xtend, | break, | chamt | er, fille | t, curv | es, con | straint | 8 | | |
| | 1 | viz. tang | gency, | paralle | ensm, n erial co | nciinat | ion and | u perpe 1 letteri | naicui | arity. I | Jimens | ioning | , | | |
| | I | Annotat | tions. I | averin | g & ot | ner fur | nctions | | ng. | | | | | | |
| | | Applvin | g dime | nsions | to obi | ects. a | pplving | g annot | ations | to drav | vings: | Setting | 7 | | |
| | ι | ip and | use of | f Laye | rs, lay | ers to | create | drawi | ngs, C | reate, | edit a | nd use | 2 | | |
| | c | customiz | zed lay | ers; Cl | hanging | g line 1 | lengths | throug | gh mod | lifying | existin | ig line | s | | |
| | (| extend/ | lengthe | en); Pri | inting of | locum | ents to | paper | using | the pr | int con | nmand | ; | | |
| | 0 | orthogra | phic p | rojectio | on tech | niques | ; Draw | ving se | ctional | views | of cor | nposite | e | | |
| VI | r | right reg | gular g | eometr | ric soli | is and | projec | t the t | rue sh | ape of | the se | ctioned | 1 | | |
| | S | surface; | Draw | ing a | nnotatio | on, Co | ompute | r-aided | desig | gn (CA | AD) so | oftwar | e | 4 | |
| | I | nodelin | g of p | arts ai | nd asse | mblies | S. Para | metric | and n | on-par | ametric | solid | , 1 | | |
| | 8 | locumer | and | of mo | dels P | louels. | . Part | on the | ig alle | ı two cluding | unne sketcl | hing o | I F | | |
| | r | documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary, and section views. Spatial | | | | | | | | | | | | | |
| | r V | perspective, isometric, multiview, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; | | | | | | | | | | | | | |
| | c | limensio | oning a | nd scal | le mult | views | of dw | elling; | , | | 0 | 1 | , | | |
| | | | | | |] | fext Bo | ooks | | | | | | | |
| 1 | | Bhatt N. 2014. | .D., Pa | nchal | V.M. a | nd Ing | le P.R. | , Engiı | neering | Draw | ing, Cl | narotar | Publis | shing H | Iouse, |
| 2 | | Shah, M 2008. | I.B. and | l Rana | B.C., 1 | Engine | ering I | Drawing | g and C | Compu | ter Gra | phics, | Pearso | n Educ | ation, |
| 3 | 1 | Agrawal | B. and | l Agrav | wal C. I | M., En | gineeri | ng Gra | phics, ' | ГМН Р | ublicat | tion, 20 |)12. | | |
| | | | | | | I | Refere | nces | | | | | | | |
| 1 | 1 | Narayan | a, K.L. | and P | Kanna | iah, Te | xt boo | k on Er | ngineer | ing Dra | awing, | Scitec | n Publi | shers, 2 | 2008. |
| 2 | V | Warren | J. Luzz | ader, F | Fundam | entals | of Eng | ineerin | g Drav | ving, P | rentice | Hall o | f India | , New 1 | Delhi, |
| | 2 | 2010 Fraddar | alt E | Ciasaa | | to Mit | ah a 11 | thoma | Duinais | las of | Engin | | Crowbi | a Ma | www.a11 |
| 3 | | McMilla | n Publ | ishing. | 2010 | a wiit | cheff (| Julers, | rinci | NCS 01 | Engine | cring | Graphi | ics, 1v18 | INWEII |
| | | | | ,0 | | U | seful I | links | | | | | | | |
| 1 | ł | nttps://n | ptel.ac. | in/cou | rses/11 | 2/103/ | 112103 | 019/ | | | | | | | |
| 2 | ł | nttps://n | ptel.ac. | in/cou | rses/10 | 5/104/2 | 105104 | 148/ | | | | | | | |
| 3 | ł | nttps://w | ww.yo | utube. | com/wa | atch?v= | =xXdp | kQXDı | ıMw& | list=PL | 9RcW | oqXm | zaJT- | | |
| | f | liqTSw | UjWU | 4zCX_ | H2A | • | D 4 | UDT | 1 D | | | | | | |
| | | | | 0- | PO Ma | ipping | For A | II B. I C mas (P | cn. Pr | ogram | S | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | - 3 | +- | - | - | 2 | - | - | - | - | 1 | | 1 | 2 | | |
| CO2 | | 1 | 2 | <u> </u> | _ | | | | <u> </u> | - | | - | | | |
| CO3 | | | | | 3 | | | | | 1 | | | | | |
| | The strength of mapping is to be written as 1.2.3: Where, 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | |
| | | | | | Asses | sment | (for T | heory | Cours | e) | | | | | |
| The asses | ssment | t is base | d on 2 | in-sem | ester ex | kamina | tions in | n the fo | rm of | T1 (Tes | st-1) an | d T2 (| Test-2) | of 20 1 | narks |
| each. Als | o there | e shall b | e 1 En | d-Sem | examir | ation (| (ESE) o | of 60 m | arks. T | 1 shall | be typ | ically | on mod | lules 1 | and |
| 2, T2 bas | ed typ | ically of | n modu | 1 les 3, 4 | 4 and E | SE sha | ill be o | n all m | odules | with n | early 5 | 0% we | ightage | e on | |
| modules | 1 to 4 | and 50% | ∕₀ weig | htage o | on modu | iles 5, | 6. | | | | | | | | |

| Assessment Plan based on Bloom's Taxonomy Level (Marks) For Theory Course | | | | | | | | | |
|---|----------------------|----|----|-----|-------|--|--|--|--|
| Blo | oom's Taxonomy Level | T1 | T2 | ESE | Total | | | | |
| 1 | Remember | | | | | | | | |
| 2 | Understand | 5 | 5 | 20 | 30 | | | | |
| 3 | Apply | 10 | 10 | 30 | 50 | | | | |
| 4 | Analyze | 5 | 5 | 10 | 20 | | | | |
| 5 | Evaluate | | | | | | | | |
| 6 | Create | | | | | | | | |
| | Total | 20 | 20 | 60 | 100 | | | | |

| Walchand College of Engineering, Sangli (Government Aided Autonomous Institute) | | | | | | | | | | | | |
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| | | | <u>(1000000000000000000000000000000000000</u> | | | | | | | | | |
| | | Course In | formation | | | | | | | | | |
| Programme | | B.Tech. | ioi mation | | | | | | | | | |
| Class. Semes | ster | First Year B Te | ch Sem I &II | | | | | | | | | |
| Course Code | | | | | | | | | | | | |
| Course Nam | <u>e</u> | Basic Electrica | Engineering | | | | | | | | | |
| Desired Real | uisites: | Busic Electrica | Digineering | | | | | | | | | |
| Tea | ching Scheme | | Examination S | Scheme (Marks) | | | | | | | | |
| Lecture | 3 Hrs/week | T1 | T2 | ESE | Total | | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
| Interaction | - | - Credits: 3 | | | | | | | | | | |
| | Course Objectives | | | | | | | | | | | |
| 1 | To summarize and solve | e electrical and m | agnetic circuits. | | | | | | | | | |
| 2 | To imparts skill to ident | ifying principles. | , construction and v | working of electrica | al machines. | | | | | | | |
| 3 | To develops skill to describe the wiring system, lamps and low voltage installation | | | | | | | | | | | |
| | Course Out | comes (CO) wit | h Bloom's Taxono | my Level | | | | | | | | |
| CO1 | Explain principles con | struction and wor | king of electrical n | nachines | Understand | | | | | | | |
| | Solve electrical and may | pretic circuits | | | Apply | | | | | | | |
| Module | | Course Co | ntents | | Hours | | | | | | | |
| | DC Circuits:- Review of R-L-C- Electrical circuit elements. KCL and KVL | | | | | | | | | | | |
| Ι | Star- delta conversion, | voltage and cur | rent sources. Theve | enin, Norton and | 6 | | | | | | | |
| | Superposition, Maximu | m power transfer | Theorems. | 1 DMG 1 | | | | | | | | |
| | AC CIrcuits:-Represent phasor representation re | | | | | | | | | | | |
| П | phase, ac circuits consi | sting of R. L. C. | RL, RC, RLC (se | ries and parallel) | 5 | | | | | | | |
| | circuits and three-phase | e balanced circui | ts. Voltage and cu | rrent relations in | C | | | | | | | |
| | star and delta | | C | | | | | | | | | |
| | DC Machines:-Constru | iction, working p | principle and types | of DC generator | | | | | | | | |
| III | and Motor. Voltage | and speed | control methods | , Speed-Torque | 6 | | | | | | | |
| | characteristics. Principle | e, construction, | working and applie | cation of stepper, | | | | | | | | |
| | TransformersMagnet | ors. | nstruction workin | a principle and | | | | | | | | |
| IV | types of single-phase | transformer. op | en circuit and sh | ort circuit tests: | 7 | | | | | | | |
| | Losses, efficiency, all-d | ay efficiency and | l regulation. Autotr | ansformer. | | | | | | | | |
| | AC Machines:-Constru | uction and work | ing principle of s | single and three- | | | | | | | | |
| V | phase induction motor. | Types, torque- sp | peed characteristics | and applications | 6 | | | | | | | |
| | of induction motor, Typ | es of starters, AC | generator. | ~ | 0 | | | | | | | |
| | Wiring, Electrical Inst | allations and Co | omponents of LT S | Switchgear | | | | | | | | |
| VI | Go-down and Domest | ELCB, MCCB. | I ypes of wire and I ED Eluorescen | cables. Staircase, | 6 | | | | | | | |
| | schemes, Earthing, type | s of batteries, ch | racteristics of batte | eries. | 0 | | | | | | | |
| | ,, | Text 1 | Books | | | | | | | | | |
| 1 | D.C. Kulshreshtha, "Ba | sic Electrical En | g <i>ineering</i> ", 1st revi | sed edition McGra | w Hill, 2012. | | | | | | | |
| 2 | D. P. Kothari and I. J. N | agrath, "Basic E | lectrical Engineeri | ng", Tata McGraw | Hill, 2010. | | | | | | | |
| 3 | B.L Theraja,"A Textboo | k of Electrical Te | echnology", S Chan | d Publication, 2013 | 3. | | | | | | | |
| | | Refer | ences | | | | | | | | | |
| 1 | V. D. Toro, "Electrical | Engineering Fun | ndamentals", Prenti | ce Hall India, 1989 | • | | | | | | | |
| 2 | E. Hughes, "Electrical | and Electronics T | Technology", Pears | on, 2010. | | | | | | | | |
| 3 | V. N. Mittle and Arvind | Mittal, "Basic E | lectrical Engineeri | ng", 2nd edition Tl | МН, 2006. | | | | | | | |

| | Useful Links | | | | | | | | | | | | | | | |
|--|---|------|----------|--------------------------------|---------|----------|--------|--------|--------|-------|-------------------------|----------|--------|---------|---------|--------|
| 1 | | ht | ttps://n | ptel.ac | .in/cou | rses/10 | 8/105/ | 108105 | 053/ | | | | | | | |
| CO-PO Mapping For All B.Tech. Programs | | | | | | | | | | | | | | | | |
| Programme Outcomes (PO) PSO | | | | | | | | | | | | | | | | |
| | 1 | | 2 | 2 3 4 5 6 7 8 9 10 11 12 1 2 3 | | | | | | | | | 3 | | | |
| CO1 | 3 | | | | | | | | | | | | | | | |
| CO2 | | | 3 | | | | | | | | | | | | | |
| | The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | | |
| Assessment (for Theory Course) | | | | | | | | | | | | | | | | |
| The acces | | nt i | ia haga | d an 2 | in com | actor of | vomino | tionai | tha fo | mm of | $\Gamma 1 (T_{\alpha})$ | (t,1) on | 4 T2 (| Toot 2) | af 20 * | montra |

The assessment is based on 2 in-semester examinations in the form of T1 (Test-1) and T2 (Test-2) of 20 marks each. Also there shall be 1 End-Sem examination (ESE) of 60 marks. T1 shall be typically on modules 1 and 2, T2 based typically on modules 3, 4 and ESE shall be on all modules with nearly 50% weightage on modules 1 to 4 and 50% weightage on modules 5, 6.

| | Assessment Plan based on Bloom's Taxonomy Level (Marks) For Theory Course | | | | | | | | | |
|-----|---|----|----|-----|-------|--|--|--|--|--|
| Bla | oom's Taxonomy Level | T1 | T2 | ESE | Total | | | | | |
| 1 | Remember | | | | | | | | | |
| 2 | Understand | | 10 | 40 | 50 | | | | | |
| 3 | Apply | 20 | 10 | 20 | 50 | | | | | |
| 4 | Analyze | | | | | | | | | |
| 5 | Evaluate | | | | | | | | | |
| 6 | Create | | | | | | | | | |
| | Total | 20 | 20 | 60 | 100 | | | | | |

| | Walcha | nd College of | f Engineering, | Sangli | | | | | | | |
|---|---|------------------------|--------------------------------|----------------------|-----------------|--|--|--|--|--|--|
| | (6 | overnment Aided A | Autonomous Institute N21_22 |) | | | | | | | |
| | | Course In | formation | | | | | | | | |
| Program | me | B Tech | ioimation | | | | | | | | |
| Class. Se | mester | First Year B Te | ech Sem L&II | | | | | | | | |
| Course (| 'ode | Thist Tear D.Te | | | | | | | | | |
| Course N | ame | Arduino Based | Systems | | | | | | | | |
| Desired 1 | Remuisites. | No pre-requisit | e course | | | | | | | | |
| Desireu | Taaching Schama | No pre-requisit | E course. | Schama (Marks) | | | | | | | |
| T 4 | | T 1 | | Scheme (Warks) | T () | | | | | | |
| Lecture | 2 Hrs/week | 11 | 12 | ESE | lotal | | | | | | |
| Tutoriai | - | 20 | 20 | 00 | 100 | | | | | | |
| Practical | cucai - | | | | | | | | | | |
| Interaction | eraction - Credits: 2 | | | | | | | | | | |
| | | Course C | Objectives | | | | | | | | |
| 1 | To explain and illustrate | e the fundamenta | ls of digital system | s and op-amps whic | h are necessary | | | | | | |
| 2 | tor Arduno based simp | ele systems. | | | | | | | | | |
| 2 | To explain, demonstrate | e the Arduino pro | gramming languag | ge and IDE | | | | | | | |
| 3 | To illustrate and demon | Istrate programing | g for basic Arduind | systems. | o for building | | | | | | |
| 4 | 4 10 illustrate how to build the prototype circuits and connect them to the Arduino for building useful systems | | | | | | | | | | |
| | Course Out | tcomes (CO) wit | h Bloom's Taxono | omv Level | | | | | | | |
| CO1 | Explain fundamentals of di | gital systems and | operational amplif | ïers | Understand | | | | | | |
| Illustrate the fundamentals of Arduino, installation of Arduino IDE, Running the Understand | | | | | | | | | | | |
| arduino executable file, Using IDE to prepare Arduino sketch | | | | | | | | | | | |
| CO3 | CO3 Writing programs for interfacing various sensors and output devices with Arduino Apply | | | | | | | | | | |
| <u>CO4</u> | Illustrate use of Arduino fo | r an application of | or a system | | Analyze | | | | | | |
| Module | | Course Con | ntents | A 11 0 17 7 | Hours | | | | | | |
| | Overview of Digital Sy Multiplayor Domultiplayo | stems:- Combina | ational Circuits- | Adder, Subtractor, | | | | | | | |
| Ι | Clocked flipflop J-K Flip | flop Counters S | vnchronous and A | synchronous MOD | 5 | | | | | | |
| | -N Counters, Shift Register | rs, Memory Bloc | k | | | | | | | | |
| | Operational amplifiers: | Block Diagram | , Basic Operatio | ons, Op-Amps as | | | | | | | |
| II | comparator, Op amp in fee | dback mode, Inve | erting/ Noninverting | g Amplifier, Adder/ | 5 | | | | | | |
| | Subtractor | | | | | | | | | | |
| | Introduction to Arduin | o:-Arduino devi | ce, Types of arc | luino, Features of | | | | | | | |
| | Installation of Arduino R | Arduino doar | u, Description of | ing IDE to prepare | | | | | | | |
| III | Arduino sketch. Uploading | and running the | e sketch. Program | notation: variables. | 5 | | | | | | |
| | functions, control flow, Ar | duino conventior | is. The concept of | a program variable. | | | | | | | |
| | Numerical values and basi | ic numerical ope | rators. If/then/else | iteration using for | | | | | | | |
| | loops. Real world timing an | nd the delay() fun | ction | | | | | | | | |
| | Input/Output Programm | ing:-Sensor Inp | uts: - Definition, | Types. Interfacing | | | | | | | |
| | distance ranging sensor | ors- light sensor | r, temperature sen | sor, sound sensor, | | | | | | | |
| IV | ultrasonic sensor Displays | Basics of LED | 's and LCD's. Into | erfacing arduino to | 4 | | | | | | |
| | LED's- blinking single LE | D, blinking mul | tiple LED's, 7 seg | ment display, LED | | | | | | | |
| | dot matrix. Interfacing to L | CD's- 16x2 LCD | display | 1 27 | | | | | | | |
| | Input/Output Programm | ing:-Motor cont | rol: DC motors- S | Speed control, spin | | | | | | | |
| v | direction control. Servo mo | otor control, Step | pers and Robots, C | ommunication over | | | | | | | |
| | Ethernet: Ethernet shield, i | nternet weather, | display, e-mail ale | ert system, Arduino | 4 | | | | | | |
| | Arduino Applications: C | - Lugging data of | duino based robot | ig Hilligopeak | | | | | | | |
| VI | PLC industrial application | ase shulles . All | unio based 1000l | cai, muunio based | 3 | | | | | | |

| | | | | | | , | Text B | ooks | | | | | | | |
|--|---|--|---------------------------------------|---------------------------------------|--|-----------------------------------|---------------------------------------|---------------------------|--------------------------------|------------------------------|----------------------------------|---------------------------|-----------------------------|-------------------------------|--------------|
| 1 | | "Arduin | o Cool | kbook' | ', Mich | ael Ma | rgolis, | O'Re | illy Pub | lication | ns, 202 | 0 | | | |
| | | | | | | | Refere | ences | | | | | | | |
| 1 | | "Beginn | ning Ar | duino' | ', Mich | al Mc I | Robert | s, Sec | ond Edi | tion, A | press F | ublish | ing, 20 |)13 | |
| 2 | | "Getting | g starte | d with | Arduir | no", Ma | assimo | Banz | i, 2 nd Ed | ition, (| O'Reill | y, 201 | 1 | | |
| | | | | | | ι | J seful I | Links | | | | | | | |
| 1 | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | |
| CO-PO Mapping For All B.Tech. Programs | | | | | | | | | | | | | | | |
| | | | r | 1 | Prog | amme | Outco | omes | (PO) | 1 | | <u>т</u> | <u> </u> | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| C01 | 3 | | | | | | | | | | | | | | |
| CO2 | | 3 | | | | | | | | | | | | | |
| CO3 | | | 2 | | | | | | | | | | | | |
| CO4 | | 2 | | | | | | | | | | | | | |
| | The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | |
| | | | | | Asse | ssmen | t (for T | Fheor | y Cours | se) | | | | | |
| The asses each. Als 2, T2 bas modules | ssme o the ed ty 1 to 4 | nt is base re shall b pically o 4 and 50% | ed on 2 be 1 En n mod % weig | in-sen Id-Sem ules 3, ghtage | nester e exami 4 and 1 on mod | examination ESE sh lules 5, | ations i (ESE) all be c , 6. | in the of 60 on all | form of marks. ' modules | T1 (Te T1 sha s with 1 | est-1) a ll be ty nearly : | nd T2 pically 50% w | (Test-2 on mo reighta | 2) of 20 odules 1 ge on | marks and |
| | | | | | | | | | | | | | | | |
| D | A | ssessmer | nt Plar | 1 base | d on Bl | oom's | Taxon | lomy | Level (N | Marks |) For T | heory | Cour | se | |
| B | loon | n's Taxor | <u>iomy I</u> | | | | Tl | | 12 | | | ESE | | Tot | al |
| 1 | | ۲ ۲ | kemem | iber | | | 10 | | 10 | | | 20 | | | |
| 2 | | l | Inderst | and | | | 10 | | 10 | | | 20 | | 4(|) |
| 3 | | | Appl | у | | | 10 | | 10 | | | 20 | | 4(|) |
| 4 | | | Analy | ze | | | | | | | | 20 | | 20 |) |
| 5 | | | Evalua | ate | | | | | | | | | | | |
| 6 | | | Creat | te | | | | | | | | | | | |
| | | Tota | ıl | | | | 20 | | 20 | | | 60 | | 10 | 0 |

| | Walchar | nd College of | Engineering, | Sangli | | | | | | | | |
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| (Government Aided Autonomous Institute) A V 2021-22 | | | | | | | | | | | | |
| | | | 121-22 | | | | | | | | | |
| Programme | | B Tech | | | | | | | | | | |
| Class Semes | ter | Eirst Vear B Te | ch Sem I & II | | | | | | | | | |
| Course Code | | Thist Tear D.Te | | | | | | | | | | |
| Course Nam | <u> </u> | Life Science (F | lective) | | | | | | | | | |
| Desired Reg | uisitos. | | | | | | | | | | | |
| | ching Scheme | -1111- | Examination | Scheme (Marks) | | | | | | | | |
| Lootuno | 2 Urg/wools | T1 | ТЭ | | Total | | | | | | | |
| Lecture | 2 HIS/Week | 11 | 12 | ESE | 100 | | | | | | | |
| Tutorial | - | 20 | 20 | 60 | 100 | | | | | | | |
| Practical | - | | | | | | | | | | | |
| Interaction | - | - Credits: 2 | | | | | | | | | | |
| | Course Objectives | | | | | | | | | | | |
| 1 | Introduce students to me | odern aspect of li | fe science. | | | | | | | | | |
| | Develop an understandi | ng of scientific n | nethods with a broa | d background in th | e life sciences at | | | | | | | |
| 2 | all levels of biological organization (from molecular, cellular, and organismal biology, to | | | | | | | | | | | |
| | populations, communities and ecosystems) | | | | | | | | | | | |
| 3 | Provide a foundation of | basic biological | principles and educ | cation in life scienc | e technologies. | | | | | | | |
| | Course Out | comes (CO) wit | h Bloom's Taxono | my Level | | | | | | | | |
| CO1 | Outline and describe cytological, biochemical, physiological and genetic Understanding | | | | | | | | | | | |
| | Explain the structure and function of organ systems in the human body and | | | | | | | | | | | |
| CO2 | describe the concept, pr | Understanding | | | | | | | | | | |
| C03 | Relate knowledge of Bi | o chemistry, Biot | echnology and Bio | informatics with | Understanding | | | | | | | |
| 03 | application areas in Eng | ineering. | | | Understanding | | | | | | | |
| Module | | Course Co | ontents | | Hours | | | | | | | |
| | Cell Biology : | | - 4 • | | | | | | | | | |
| | Structure and function of | f prokaryotic cel | CHONS 1 (Typical Bacteria | l Cell) and | | | | | | | | |
| Ι | eukarvotic cell (Plant | cell and animal | cell) and intrace | llular organelles | 3 | | | | | | | |
| | Mechanism of cell d | ivision including | g (mitosis and m | neiosis) and cell | | | | | | | | |
| | differentiation; Cell-cel | l interaction. | | , | | | | | | | | |
| | Bio Chemistry : | | | | | | | | | | | |
| | Introduction to Struct | ure of atoms, mo | olecules and chem | ical bonds, | | | | | | | | |
| ч | Principles of physical | chemistry, Ther | modynamics, kine | tics, dissociation | 4 | | | | | | | |
| 11 | and association constant | its, Nucleic acid | structure, genetic | code, replication, | 4 | | | | | | | |
| | function and metabolist | n of carbohydrat | es lipids and prote | ins Enzymes and | | | | | | | | |
| | coenzyme. | ii or curbony arus | es, inplus und prote | ins, Enzymes and | | | | | | | | |
| | Human Physiology: | | | | | | | | | | | |
| | a. Digestive system - D | igestion, absorpt | ion, energy balance | 2 | | | | | | | | |
| | b. Respiratory system | n: Comparison | of respiration in | different species, | | | | | | | | |
| | anatomical consideration | ons, transport of | f gases, exchange | of gases, waste | | | | | | | | |
| | elimination, neural and | chemical regulat | ion of respiration. | and the set of the | | | | | | | | |
| | brain and spinal cord of | entral and periph | eral nervous syste | m neural control | | | | | | | | |
| III | of muscle tone and post | ure. | icial nel vous syste | | 9 | | | | | | | |
| | d. Excretory system: | on, kidney, urine | | | | | | | | | | |
| | formation, urine concer | ion, regulation of | | | | | | | | | | |
| | water balance, blood vo | olume, blood pre | ssure, electrolyte b | alance, acid-base | | | | | | | | |
| | balance. | . ~ | | | | | | | | | | |
| | e. Cardiovascular Sy | ystem: Compara | ative anatomy of | heart structure, | | | | | | | | |
| 1 | myogenic heart, specia | inzea tissue, EC | $G - \pi s$ principle | and significance, | | | | | | | | |

| | cardiac cycle, heart as a pump, blood pressure, f. Endocrinology and reproduction - Endocrine glands, basic mechanis of hormone action, hormones and diseases; reproductive processe gametogenesis, ovulation, neuroendocrine regulation. | m es, | | | | | | | | |
|---|---|----------------------|-----------|------|--|--|--|--|--|--|
| IV | Immunity: Introduction, definition and types of Immunities and Antigens, Immunoglobulins: Structure and functions of different classes immunoglobulins, Primary and secondary immune response, Lymphocyte and accessory cells, Humoral and cell mediated immunity, Mechanism immune response and generation of immunological diversity, Application immunological techniques. | of es of of | 4 | | | | | | | |
| V | Biotechnology and Its Applications: Principles and process of Biotechnology: Genetic engineerin (Recombinant DNA technology). Application of Biotechnology in health and agriculture: Production secondary metabolites/products: Insulin, Growth hormones: Indoleacetic acid, interferons. Methods of gene transfer in plants, crop improvement. Introduction to transgenics: Gene therapy, Genetically modified organisms Biosafety issues– Bio piracy. | ng of ne ed | 4 | | | | | | | |
| VI | Bioinformatics and its Applications: Introduction and Definition of Bioinformatics, Molecular Bioinformatics: Genomics, Proteomics and Drug Design. Organic and Community Bioinformatics: Bioinformatics of specied diversity. Applications of Bioinformatics: Human health, Microbial genom application, Biotechnology, Agriculture, Comparative studies. | es | 4 | | | | | | | |
| | Text Books | | | | | | | | | |
| 1 | T. S. Ranganathan, Text book of Human Anatomy, S. Chand and Company | Ltd, 20 | 002. | | | | | | | |
| 2 | P. S. Verma and V. K. Agarwal, Concept of Cell Biology, S. Chand and Cor | npany | Ltd, 200 | 2. | | | | | | |
| 3 | R. D. Vidyarthi and P. N. Pandey, A Text book of Zoology, S. Chand and Co | ompan | y Ltd, 20 | 004. | | | | | | |
| 1 | Bruce Alberts and Alexander Johnson, Molecular Biology of the Cell Garla | nd Sci | ence, Ta | ylor | | | | | | |
| 2 | A Francis Group, our Edition, 2015. Peter H. Raven, George B. Johnson, Biology, McGraw hill, 11th edition, 20 | 17 | | | | | | | | |
| 3 | Laurence A. Cole, Biology of Life - Biochemistry Physiology and Philosop | $h_{\rm T}$ | sevier ? | 016 | | | | | | |
| 5 | Laurence A. Cole, Biology of Life - Biochemistry, Physiology and Philosophy, Elsevier, 2016. | | | | | | | | | |
| | Useful Links | | | | | | | | | |
| 1 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M | JIIY, EI | | 016. | | | | | | |
| 1 2 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 | лу, ш | | 016. | | | | | | |
| 1 2 3 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw | | | 016. | | | | | | |
| 1 2 3 4 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=nzJXq4YMPYE | | | 016. | | | | | | |
| 1 2 3 4 5 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=nzJXq4YMPYE https://www.youtube.com/watch?v=ssIBNVLSG58 | | | 016. | | | | | | |
| 1 2 3 4 5 1 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=sQ9LgvQs5Nw https://www.youtube.com/watch?v=ssIBNVLSG58 https://www.youtube.com/watch?v=yaQhH9iKY0M | | | | | | | | | |
| 1 2 3 4 5 1 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=nzJXq4YMPYE https://www.youtube.com/watch?v=ssIBNVLSG58 https://www.youtube.com/watch?v=yaQhH9iKY0M CO-PO Mapping For All B.Tech. Programs | | | 016. | | | | | | |
| 1 2 3 4 5 1 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=sQ9LgvQs5Nw https://www.youtube.com/watch?v=ssIBNVLSG58 https://www.youtube.com/watch?v=yaQhH9iKY0M CO-PO Mapping For All B.Tech. Programs Programme Outcomes (PO) | | PSO | | | | | | | |
| 1 2 3 4 5 1 1 | Internation, Findential, Findential | | PSO 2 | 3 | | | | | | |
| 1 2 3 4 5 1 1 CO1 | Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=SQ9LgvQs5Nw https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=sQ9LgvQs5Nw https://www.youtube.com/watch?v=sIBNVLSG58 https://www.youtube.com/watch?v=yaQhH9iKY0M CO-PO Mapping For All B.Tech. Programs Programme Outcomes (PO) 2 3 4 5 6 7 8 9 10 11 12 | | PSO 2 | 3 | | | | | | |
| 1 2 3 4 5 1 1 CO1 CO2 | Useful Links Item Distribution, Projectory and Printory Useful Links https://www.youtube.com/watch?v=yaQhH9iKY0M https://www.youtube.com/watch?v=V6s0xOTNmT4 https://www.youtube.com/watch?v=5Q9LgvQs5Nw https://www.youtube.com/watch?v=sQ9LgvQs5Nw https://www.youtube.com/watch?v=ssIBNVLSG58 https://www.youtube.com/watch?v=yaQhH9iKY0M CO-PO Mapping For All B.Tech. Programs Programme Outcomes (PO) 2 3 4 5 6 7 8 9 10 11 12 1 1 1 1 1 1 1 1 1 | | PSO 2 | 3 | | | | | | |

| Walchand College of Engineering, Sangli (Government Aided Autonomous Institute) | | | | | | | | | | | |
|--|--|-------------------------------|----------------------------|---------------------|--------------------|--|--|--|--|--|--|
| | (| AV 20 | 21-22 | | | | | | | | |
| | | Course Inf | ormation | | | | | | | | |
| Programme | | B.Tech. | | | | | | | | | |
| Class, Semest | er | First Year B.Tech | ., Sem I &II | | | | | | | | |
| Course Code | | | | | | | | | | | |
| Course Name | ; | Engineering Grap | hics and AutoCAD |) Lab | | | | | | | |
| Desired Requ | isites: | Basic Knowledge | of Computer | | | | | | | | |
| Teacl | hing Scheme | | Examination So | cheme (Marks) | | | | | | | |
| Lecture | - | LA1 | LA2 | Lab ESE | Total | | | | | | |
| Tutorial | - | 30 | 30 | 40 | 100 | | | | | | |
| Practical | 2 Hrs/week | | | | | | | | | | |
| Interaction | - | | Cred | its: 1 | | | | | | | |
| Course Objectives | | | | | | | | | | | |
| 1 | To impart the technic | ues of engineering | graphics using the | CAD software | | | | | | | |
| 2 | To prepare the students for applying knowledge of engineering graphics in real life drawings | | | | | | | | | | |
| 3 | using CAD software To develop the skills of students for evaluating CAD software for its applications | | | | | | | | | | |
| 3 | Course Ou | utcomes (CO) with | Bloom's Taxono | my Level | | | | | | | |
| ~~ 1 | Understand the basic | principle of Engine | ering graphics and | working of | Understanding | | | | | | |
| COI | CAD software. | rr8 | 8 8F | | 8 | | | | | | |
| CO2 | Draw different views | of components using | ng the CAD softwa | are. | Applying | | | | | | |
| CO3 | Apply the knowledge | e of engineering gra | phics in real life ap | oplications. | Applying | | | | | | |
| List of Experiments / Lab Activities. | | | | | | | | | | | |
| 1 Plane Curves and Conic Sections (Min. 5 Problems) 2 Projections of Prints as 11 in (Min. 5 Problems) | | | | | | | | | | | |
| 2 | 2 Projections of Points and Lines (Min. 5 Problems) | | | | | | | | | | |
| 3 | Projections of Plane | es and Solids (Mir | n. 6 Problems) | | | | | | | | |
| 4 | Development of La | teral Surfaces (Mi | in. 3 Problems) | | | | | | | | |
| 3 | Isometric Projection | ctions (Min. 2 Pro | me) | | | | | | | | |
| 6 | Isometric Frojection | lis (Iviiii. 2 Fioblei | 115) | | | | | | | | |
| | • | Text B | ooks | | | | | | | | |
| 1 | Bhatt N.D., Panchal 2014 | V.M. and Ingle P.F | R., Engineering Dr | awing, Charotar P | ublishing House, | | | | | | |
| 2 | Shah, M.B. and Rana 2008. | a B.C., Engineering | Drawing and Corr | puter Graphics, Pe | earson Education, | | | | | | |
| 3 | Agrawal B. and Agra | awal C. M., Enginee | ering Graphics, TM | IH Publication, 20 | 12. | | | | | | |
| | 1 | Refere | ences | | | | | | | | |
| 1 | Narayana, K.L. and 2008. | P Kannaiah, Text | book on Enginee | ering Drawing, Sc | eitech Publishers, | | | | | | |
| 2 | Warren J. Luzzader Delhi, 2010 | , Fundamentals of | Engineering Drav | ving, Prentice Ha | ll of India, New | | | | | | |
| 3 | Fredderock E. Giese McMillan Publishing | cke, Alva Mitchell 3, 2010 | others, Principles | of Engineering G | raphics, Maxwell | | | | | | |
| | | Useful | Links | | | | | | | | |
| 1 | https://nptel.ac.in/cou | urses/112/103/11210 | 03019/ | | | | | | | | |
| 2 | https://nptel.ac.in/cou | arses/105/104/1051 | 04148/ | | | | | | | | |
| 3 | nttps://www.youtube fliqTSwUjWU4zCX | .com/watch'/v=xXd H2A | I <u>PKQXDuMw&list</u> | <u>=PL9KcWoqXmz</u> | 1J 1 - | | | | | | |

| CO-PO Mapping For All B.Tech. Programs | | | | | | | | | | | | | | | |
|--|-----------------------------|----------|----------|---------|-----------------|----------|--------------------------------|---------|-------------|----------|----------|--------------------|----------------|----------|---------|
| | | | | | Progra | amme | Outco | mes (P | PO) | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | | | | 2 | | | | | 1 | | 1 | 2 | | |
| CO2 | | | 2 | | | | | | | | | | | | |
| CO3 | | | 3 1 | | | | | | | | | | | | |
| | The | e streng | th of n | nappin | g is to b | e writt | en as 1 | ,2,3; W | /here, i | l:Low, | 2:Med | lium, 3 | :High | | |
| | | | | | Asse | ssmen | t (for l | Lab. C | ourse) | | | | | | |
| There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation. | | | | | | | | | | | | | | | |
| Assessment Based on Conducted by Typical Schedule (for 26-week Sem) M | | | | | | | | | | | Μ | larks | | | |
| TA1 | | Lab a | ctivitie | s, | Lab (| Course | Dı | uring W | /eek 1 | to Wee | k 6 | | | | 30 |
| | attendance, journal Fa | | | | | | Μ | arks Su | ıbmissi | on at tl | he end | of Wee | ek 6 | | 50 |
| LA2 | | Lab a | ctivitie | s, | Lab (| Course | ourse During Week 7 to Week 12 | | | | | | | 30 | |
| attendance, journal Fa | | | | | | culty | M | arks Su | | on at t | he end | of Wee | ek 12 | | 00 |
| Lab ESH | Lab ESE Lab activities, Lab | | | | Lab (| Course | | iring W | eek 15 | to We | ek 18 | ofWa | 1-10 | | 40 |
| Week 1 in | dicates | startin | a week | | Гас Semester | r The t | vnical | arks Su | le of la | b asses | sement | $\frac{01}{10}$ we | $\frac{2K}{2}$ | nsider | ing a |
| 26-week s | emeste | er. The | g weer | schedu | ile shall | be as r | ypical per aca | demic | calenda | ar. Lab | activit | ies/Lal | nerfo | rmance | shall |
| include pe | rformi | ng exp | erimen | ts, mir | ni-projec | et, pres | entatio | ns, dra | wings, | progra | mming | g and o | ther su | itable | , on an |
| activities, | as per | the nat | ure and | l requi | rement | of the l | ab cou | rse. Th | e expe | rimenta | al lab s | hall ha | ve typi | ically 8 | -10 |
| experimen | ts. | | | | | | | | | | | | | | |
| | | | As | sessm | ent Plai | 1 based | l on B | loom's | Taxor | omy I | Level | | | | |
| Bl | loom's | Taxon | omy L | evel | |] | LA1 | | LAZ | 2 | La | b ESE | | Tota | ıl |
| | I | Remem | ber | | | | | | | | | | | | |
| | ι | Jnderst | and | | | | 10 | | 10 | | | 10 | | 30 | |
| | | Appl | у | | | | 15 | | 15 | | | 20 | | 50 | |
| | Analyze | | | | | 5 5 10 | | | | 20 | | | | | |
| Evaluate | | | | | | | | | | | | | | | |
| | | Creat | e | | | | | | | | | | | | |
| | | Tota | 1 | | | | 30 | | 30 | | | 40 | | 100 |) |
| <u>I</u> | | | | | | | | | | | | | | | |

| | | | W | alcha | nd C | olleg | e of E led Aut | Engin onomo | eerin | ig, Sa | ngli | | | | |
|--|---|-------------------|----------------------|------------|------------------------|----------|----------------------|----------------|-----------------|---------------|---------|----------------------|----------------------|-----------------|------|
| | | | | (| 50701111 | A | Y 2021 | 1-22 | 110111 | uic) | | | | | |
| | | | | | | Cours | e Info | rmatio | n | | | | | | |
| Programme |) | | | | B.Tec | h. | | | | | | | | | |
| Class, Seme | ster | | | | First Y | lear B. | Tech., | Sem I | &II | | | | | | |
| Course Cod | le | | | | | | | | | | | | | | |
| Course Nan | ne | | | | Basic | Electri | cal Eng | gineeri | ng Lab |) | | | | | |
| Desired Rec | quisi | tes: | | | | | | | | | | | | | |
| Tea | chin | g Sche | eme | | | | | Exan | ninatio | n Sche | me (M | arks) | | | |
| Lecture | | | - | | | LA1 | | Ι | LA2 | | Lab] | ESE | | Tota | 1 |
| Tutorial | | | - | | | 30 | | | 30 | | 4(|) | | 100 | |
| Practical | | 2 H | rs/wee | k | | | | | | | | | | | |
| Interaction | | | - | | Credits: 1 | | | | | | | | | | |
| Course Objectives | | | | | | | | | | | | | | | |
| 1 | Τ | o dem | onstrat | e basic | knowle | edge of | f Electr | rical er | ngineer | ing. | | | | | |
| 2 | T | o deve | lop ski | ills to re | ecogniz | ze work | king pr | inciple | , const | ruction | and ty | pes of | electric | cal | |
| | | | Cou | rse Ou | tcome | s (CO) | with l | Bloom | 's Taxo | onomy | Level | | | | |
| CO1 | I | Describ | e basic | c conce | pts of e | electric | al circu | uits and | d vario | us theo | rems. | | R | lemem | ber |
| CO2 | CO2Demonstrate the use of transformers and AC/DC machines.Apply | | | | | | | | | | | | | | |
| | | | | L | ist of H | Experii | ments | / Lab | Activit | ies. | | | | | |
| 1 To study AC and DC machines parts and their functions. | | | | | | | | | | | | | | | |
| 2 | Т | o stud | ly serie | es-para | llel Rl | L, RC | and R | LC cit | cuits | | | | | | |
| 3 | Т | 'o veri | fy KV | L and | KCL t | heorer | ns. | | | | | | | | |
| 4 | S | tudy c | of AC/ | DC mo | otor sta | arters | | | | | | | | | |
| 5 | Т | 'o stud | ly spee | ed cont | rol tec | hnique | es of a | c and | dc ma | chines | | | | | |
| 6 | Т | o perfo | orm loa | d test | on tran | sforme | er. | | | | | | | | |
| 7 | Т | o study | y servo | motor | / steep | er mot | or with | h appli | cation | | | | | | |
| 8 | S | tudy of | f instal | lation t | echniq | ues usi | ng fuse | e, MCI | B and M | ACCB. | | | | | |
| | - | <u> </u> | | | D . F | | ext Bo | oks | | <u> </u> | | | ~ * | | 1.0 |
| 1 | | D.C. Ku | lishres | htha, " | Basic E | lectric | al Eng | ineerii | <i>ig",</i> Ist | t revise | d editi | on Mc | Jraw F | <u>1111, 20</u> | 12. |
| 2 | | D.P Kot | hari ar | nd I.J N | agrath, | Basi | c Elect | rical E | inginee | ering", | Tata N | IcGraw | ⁷ H1ll, 1 | 2010. | |
| | T | 7 NT N | /i++1- | nd A- | rind M | R | eteren | ces | oal E | air ' | | nd all | ion T | ata M. | Crow |
| 1 | E E | '. IN. IV 1411 | inule a | ing Arv | ma wi | Illai, I | Dusic I | слести | cui En | gineeri | ng , 2 | na ean | 1011, 13 | ata IVIC | Glaw |
| | <u> </u> | | | | | Us | eful L | inks | | | | | | | |
| 1 | h | ttps://n | ptel.ac | .in/cou | rses/10 | 8/105/ | 108105 | 5053/ | | | | | | | |
| | 1 | * | * | CO-I | PO Ma | pping | For Al | ll B.Te | ch. Pro | ogram | S | | | | |
| | | | | | Progr | amme | Outco | mes (l | PO) | | | | | PSO | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| CO1 | 3 | | | | | | | | | | | | | | |
| CO2 | 3 | | | | | | | | 2 | | | | | | |
| | The | streng | th of \overline{n} | napping | g is to \overline{b} | e writt | en as $\overline{1}$ | ,2,3; V | Vhere, | 1:Low, | 2:Med | dium, $\overline{3}$ | :High | _ | |

| Assessment (for Lab. Course) | | | | | | | | | | | |
|--|---------------------|--------------|--|-------|--|--|--|--|--|--|--|
| There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing, LA1, LA2 together is treated as In-Semester Evaluation. | | | | | | | | | | | |
| Assessment | Based on | Conducted by | Typical Schedule (for 26-week Sem) | Marks | | | | | | | |
| TA1 | Lab activities, | Lab Course | During Week 1 to Week 6 | 20 | | | | | | | |
| LAI | attendance, journal | Faculty | Marks Submission at the end of Week 6 | 30 | | | | | | | |
| 1.4.2 | Lab activities, | Lab Course | During Week 7 to Week 12 | 20 | | | | | | | |
| LAZ | attendance, journal | Faculty | Marks Submission at the end of Week 12 | 30 | | | | | | | |
| Lab ESE | Lab activities, | Lab Course | During Week 15 to Week 18 | 40 | | | | | | | |
| | attendance, journal | Faculty | Marks Submission at the end of Week 18 | 40 | | | | | | | |

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

| Assessment Plan based on Bloom's Taxonomy Level | | | | | | | | | |
|---|-----|-----|---------|-------|--|--|--|--|--|
| Bloom's Taxonomy Level | LA1 | LA2 | Lab ESE | Total | | | | | |
| Remember | 25 | 15 | 10 | 50 | | | | | |
| Understand | | | | | | | | | |
| Apply | 5 | 15 | 30 | 50 | | | | | |
| Analyze | | | | | | | | | |
| Evaluate | | | | | | | | | |
| Create | | | | | | | | | |
| Total | 30 | 30 | 40 | 100 | | | | | |

| (Government Ailed Autonomous Institute) AY 2021-22 Course Information Programme B. Tech. Class, Semester First Year B. Tech., Sem I &II Course Code Course Code Course Name Engineering Chemistry Lab. Desired Requisites: Chemistry course at secondary and higher secondary level Teaching Scheme Examination Scheme (Marks) Lecture - LA1 LA2 Lab ESE Total Tutorial - Course Objectives 1 To make the student familiar with analytical techniques. 2 To provide hands on practice of titrimetric analysis. Course Outcomes (CO) with Bloom's Taxonomy Level Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material. Applying materia. List of Experiments / Lab Activities. 1 Estimation |
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| AY 2021-22 Course Information Programme B.Tech. Class, Semester First Year B.Tech., Sem I &II Course Code Engineering Chemistry Lab. Desired Requisites: Chemistry course at secondary and higher secondary level Teaching Scheme Examination Scheme (Marks) Lecture - LA1 LA2 Lab ESE Total Tutorial - 30 30 40 100 Practical 2 Hrs/week Interaction - Credits: 1 Course Objectives 1 To make the student familiar with analytical techniques. 2 To provide hands on practice of titrimetric analysis. Course Outcomes (CO) with Bloom's Taxonomy Level Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material. Applying 1 Estimation of hardness of water by EDTA method (Complexometric Titration). 4 2 Estimation of Sizeoft of oxygen in water (Argentometry). 5 Demonstration of Chloride content in water (Argentometry) |
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| Programme B. Tech. Class, Semester First Year B. Tech., Sem I &II Course Name Engineering Chemistry Lab. Desired Requisites: Chemistry course at secondary and higher secondary level Teaching Scheme Examination Scheme (Marks) Lecture - LA1 LA2 Lab ESE Total Tutorial - 30 30 40 100 Practical 2 Hrs/week - Course Objectives 1 To make the student familiar with analytical techniques. - - 2 To provide hands on practice of titrimetric analysis. - - - Course Outcomes (CO) with Bloom's Taxonomy Level - - - Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material. - - 1 Estimation of hardness of water by EDTA method (Complexometric Titration). - - 2 Estimation of Dissolved Oxygen in water (Idoometric Titration). - - 3 Estimation of Choride content in water (Argentometry). - - - |
| Class, Semester First Year B. Tech., Sem 1 & 11 Course Code Engineering Chemistry Lab. Desired Requisites: Chemistry course at secondary and higher secondary level Teaching Scheme Examination Scheme (Marks) Lecture - LA1 LA2 Lab ESE Total Tutorial - 30 30 40 100 Practical 2 Hrs/week - Course Objectives Interaction - Credits: 1 Course Outcomes (CO) with Bloom's Taxonomy Level Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material. Applying Col Estimation of hardness of water by EDTA method (Complexometric Titration). Applying 3 Estimation of Chloride content in water (Neutralization Titration). Estimation of Chloride content in water (Argentometry). 5 Demonstration of pH metre & H metric titration. Estimation of strength of acid/base conductometrically. Popletical of ph metre & pH metric titration). 9 Estimation of Zeroper from Bronze. (lodometric Titration). 9 Estimation of Zeroper from Bronze. (lodometric Titration). |
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| Teaching SchemeExamination Scheme (Marks)Lecture-LA1LA2Lab ESETotalTutorial-303040100Practical2 Hrs/weekInteraction-Credits: 1Interaction-Course Objectives-1To make the student familiar with analytical techniques2To provide hands on practice of titrimetric analysisCourse Outcomes (CO) with Bloom's Taxonomy Level-Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material.Applying1Estimation of hardness of water by EDTA method (Complexometric Titration)2Estimation of alkalinity of water (Neutralization Titration)3Estimation of Dissolved Oxygen in water (Iodometric Titration)4Estimation of PH meter & PH metric titration6Determination of Strength of acid/base conductometrically7Colorimetric estimation of Copper8Estimation of Copper from Bronze. (Iodometric Titration)9Estimation of Zn from Brass (Displacement Titration)9Estimation of Zn from Brass (Displacement Titration). |
| Lecture-LA1LA2Lab ESETotalTutorial-303040100Practical2 Hrs/weekInteraction-Credits: 1-To make the student familiar with analytical techniques2To provide hands on practice of titrimetric analysisCourse Outcomes (CO) with Bloom's Taxonomy Level-Apply principles of Volumetry to quantitative analysis of water quality parameter, metal and alloys. Demonstrate use of instrument for quantitative analysis. Experiment physical/Chemical characteristics of material.ApplyingCol-List of Experiments / Lab Activities1Estimation of hardness of water by EDTA method (Complexometric Titration)2Estimation of Chloride content in water (Argentometry)3Estimation of Chloride content in water (Argentometry)4Estimation of Strength of acid/base conductometrically7Colorimetric estimation of Copper8Estimation of Copper from Bronze. (Iodometric Titration)9Estimation of Zn from Brase (Displacement Titration)9Estimation of Zn from Brase (Displacement Titration). |
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| COT quantitative analysis. Experiment physical/Chemical characteristics of material. Applying Applying List of Experiments / Lab Activities. 1 Estimation of hardness of water by EDTA method (Complexometric Titration). 2 Estimation of alkalinity of water (Neutralization Titration). 3 Estimation of Dissolved Oxygen in water (Iodometric Titration). 4 Estimation of Chloride content in water (Argentometry). 5 Demonstration of pH meter & pH metric titration. 6 Determination of strength of acid/base conductometrically. 7 Colorimetric estimation of Copper. 8 Estimation of Zn from Brase (Displacement Titration). 9 Estimation of Zn from Brase (Displacement Titration). |
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| 8 Estimation of copper from Bronze. (Iodometric Titration). 9 Estimation of Zn from Brass (Displacement Titration). |
| 9 Estimation of Zn from Brass (Displacement Titration). |
| |
| 10 Determination of purity of Iron (Redox Titration). |
| II Determination of viscosity of given liquid. By Ostwald viscometer. 12 Determination of viscosity of given liquid. By Ostwald viscometer. |
| 12 Determination of corrosion rate by weight loss method |
| Tort Poole |
| College Practical Chemistry, V K Abaluwaliya Sunita Dhingra Adarsha Culati, Universitian |
| 1 Conege Tractical Chemistry, V K Analuwanya.Sumta Dhingra,Adarsha Gulati, Universities |
| Laboratory Manual on Engineering Chemistry by Sudha Rani And, S.K. Bashin, Dhanpat Rai |
| $\frac{2}{\&}$ Co. |
| References |
| 1 Engineering Chemistry Laboratory Manual, Department of Chemistry WCE, Sangli. |
| J Mendham, R.C. Denney, J.D. Barnes, M.J.K Thomas, "Ouantitative Chemical analysis". |
| Vogels, Pearson Education, 2008, 6th Edition. |
| Useful Links |
| https://www.lccc.edu/academics/science-and-engineering/science-in-motion/labs- |
| equipment/chemistry-lab-experiments |
| 2 https://edu.rsc.org/resources/collections/classic-chemistry-experiments |

| CO-PO Mapping For All B.Tech. Programs | | | | | | | | | | | | | | | |
|--|---|----------|-----------------------|-------------------------------|-------------------------------------|----------|--|---------|---------|---------|----------|---------|---------|----------|-------|
| Programme Outcome | | | | mes (I | PO) | | | | | PSO | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 6 7 8 9 10 11 12 | | | 1 | 2 | 3 | | | |
| CO1 | 1 | 1 | | | | | | | | | | | | | |
| The strength of mapping is to be written as 1,2,3; Where, 1:Low, 2:Medium, 3:High | | | | | | | | | | | | | | | |
| Assessment (for Lab. Course) | | | | | | | | | | | | | | | |
| There are three components of lab assessment, LA1, LA2 and Lab ESE. IMP: Lab ESE is a separate head of passing. LA1, LA2 together is treated as In-Semester Evaluation. | | | | | | | | | | | | | | | |
| Assessme | nt | Bas | sed on | | Condu | cted b | у | Туріс | al Sch | edule (| for 26 | -week | Sem) | N | larks |
| т а 1 | | Lab a | ctivitie | es, | Lab (| Course | Dı | iring V | Veek 1 | to Wee | k 6 | | | | 20 |
| LAI | | attendar | nce, jou | ırnal | Fac | culty | M | arks Su | ıbmissi | on at t | he end | of Wee | ek 6 | | 30 |
| τ Δ 2 | Lab activities, Lab Course During Week 7 to V | | Lab activities, Lab C | | Lab Course During Week 7 to Week 12 | | | | | | 30 | | | | |
| L/112 | ; | attendar | nce, jou | ırnal | Faculty Marks | | FacultyMarks Submission at the end of Week | | | | ek 12 | | 50 | | |
| Lab ESF | - , | Lab a | ctivitie | ivities, Lab Course During We | | | Veek 15 | 5 to We | ek 18 | | | | 40 | | |
| Late LSL attendance, journal Faculty Marks Submission at the end of Week 18 | | | | | | | | | | | | | | | |
| Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a | | | | | | | | ing a | | | | | | | |
| 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance sh | | | | | | | | e shall | | | | | | | |
| include per | riorm | ing expe | erimen | ts, min | 1-projec | et, pres | entatio | ns, ara | wings, | progra | imming | g and o | ther su | | 10 |
| activities, a | as per | the nau | ure and | requi | rement (| of the I | ab cou | rse. II | ie expe | riment | ai iao s | nan na | ve typ | ically c | -10 |
| experimen | 15. | | Δς | sessme | nt Plar | n haser | l on R | loom's | Taxo | 10mv l | evel | | | | |
| Assessment Fian based on bloom's faxonomy Level | | | | | | Tote | | | | | | | | | |
| | UUIII | Remem | ber | | | | 10 | | 10 | | La | 15 | | 35 | 41 |
| | | Underst | and | | | | 10 | | 10 | | | 10 | | 30 | |
| | | Annly | | | | | 10 | | 10 | | | 10 | | | |
| | | Appl | y | | | | 10 | | 10 | | | 13 | 35 | | |
| | | Analy | ze | | | | 0 | | 0 | | | 0 | | | |
| | | Evalua | ate | | | | 0 | | 0 | | | 0 | | 0 | |
| | | Creat | e | | | | 0 | | 0 | | | 0 | | 0 | |
| | | Tota | l | | | | 30 | | 30 | | | 40 | | 100 | |

| Walchand College of Engineering, Sangli | | | | | | | | | | | | | | |
|---|--|--|---------|----------|---------------------------|-------------|------------------------|-----------|-----------|----------|----------|--------|-------|---|
| | | | (0 | Governn | nent Aic | led Aut | onomol | us Instit | ute) | | | | | |
| | | | | | Cours | e Info | L- <i>22</i> rmatic | m | | | | | | |
| Programme | | | | B.Tec | h. | | man | /11 | | | | | | |
| Class. Semest | er | | | First Y | ear B. | Tech | Sem I | &II | | | | | | |
| Course Code | - | | | | | , | | | | | | | | |
| Course Name | | | | Arduir | Arduino Based Systems Lab | | | | | | | | | |
| Desired Requ | isites: | | | - | | | | | | | | | | |
| Teacl | hing Sche | eme | | | | | Exan | ninatio | n Sche | me (M | arks) | | | |
| Lecture | | - | | | LA1 | | Ι | LA2 | | Lab I | ESE | | Total | 1 |
| Tutorial | | - | | | 30 | | | 30 | | 40 |) | | 100 | |
| Practical | 2 H | rs/wee | k | | | | | | | | | | | |
| Interaction | | - | | | | | | C | redits: | 1 | | | | |
| Course Objectives | | | | | | | | | | | | | | |
| To demonstrate and facilitate students to learn the fundamentals of digital systems and op- | | | | | | | | | | | | | | |
| 1 | amps w | amps which are necessary for Arduino based simple systems. | | | | | | | | | | | | |
| 2 | To expla | ain, der | nonstr | ate the | Arduir | no prog | gramm | ing lan | guage | and IDI | E | | | |
| 3 | To illust | rate ar | nd dem | onstrat | e prog | raming | g for ba | asic Ard | luino s | ystems | | | | |
| 4 | To illustrate and facilitate to build the prototype circuits and connect them to the Arduino for | | | | | | | | | | | | | |
| ⁴ building useful systems. | | | | | | | | | | | | | | |
| Course Outcomes (CO) with Bloom's Taxonomy Level | | | | | | | | | | | | | | |
| CO1 | Arduino sketch. Apply | | | | | | | | | | | | | |
| CO2 | Interfac | Interface various sensors with Arduino Analyze | | | | | | | | | | | | |
| CO3 | Use Arduino to build specific application/system. Evaluate | | | | | | | | | | | | | |
| | | | L | ist of H | Experi | ments | / Lab | Activit | ies. | | | | | |
| 1 | Writing | g a pro | gram t | to blink | the o | nboar | d LEC |) | | | | | | |
| 2 | Arduin | o inter | facing | with 7 | Fricolo | or LED |) and] | Push b | utton | | | | | |
| 3 | Sensing | g analo | og volt | age usi | ing on | board | ADC | and pr | inting | it on s | erial n | nonito | r | |
| 4 | Using A | Arduin | o to ge | enerate | Pulse | width | n mod | ulation | outpu | t | | | | |
| 5 | Arduin | o-base | d serv | o moto | or cont | rol | | | | | | | | |
| 6 | Interfac | cing of | ultras | onic di | istance | e senso | or(HC | C-SR04 |) with | Ardiu | ino | | | |
| 7 | Etherne | et and | WiFi (| Connec | <u>tivity</u> | with A | Arduir | 10 | | | | | | |
| 8 | Arduin | o inter | facing | with 1 | ricolo | or LCL |) alva | | | | | | | |
| 1 | "Arduin | n Cook | hook" | Micha | el Mar | zolis (| OKS)'Reilly | Public | ations | 2020 | | | | |
| 1 | Arduin | 0 000 | | IVIICIIU | R | eferen | ces | Tublic | ations, | 2020 | | | | |
| 1 | "Beginn | ing Arc | luino", | Micha | Mc Ro | berts, | Secon | d Editio | on, Apr | ess Pul | olishing | , 2013 | } | |
| 2 | "Getting | g starte | ed with | Arduin | o", Ma | issimo | Banzi, | 2nd Ed | ition, (| D'Reilly | , 2011 | | | |
| | · · · · · · · · · · · · · · · · · · · | | | | Us | eful L | inks | | | | | | | |
| | | | CO-I | PO Ma | pping | For Al | l B.Te | ch. Pro | ogram | S | | | | |
| | | - | - | Progra | amme | Outco | mes (l | 20) | | | | _ | PSO | |
| | . 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 |
| | | | | | | | | | | | | | | |
| | 3 | | 2 | | | | | | | | | | | |
| | The strong | th of m | | | o umitt | an aa 1 | 2 2. 5 | Whore | 1.I. orri | 2.Mad | lium 2 | Uich | | |

| Assessment (for Lab. Course) | | | | | | | | | | |
|---|---|--------------|--|-------|--|--|--|--|--|--|
| There are three components of lab assessment, LA1, LA2 and Lab ESE. | | | | | | | | | | |
| IMP: Lab ES | IMP: Lab ESE is a separate nead of passing. LA1, LA2 together is treated as in-Semester Evaluation. | | | | | | | | | |
| Assessment | Based on | Conducted by | Typical Schedule (for 26-week Sem) | Marks | | | | | | |
| LA1 | Lab activities, | Lab Course | During Week 1 to Week 6 | 20 | | | | | | |
| | attendance, journal | Faculty | Marks Submission at the end of Week 6 | 50 | | | | | | |
| T A 2 | Lab activities, | Lab Course | During Week 7 to Week 12 | 20 | | | | | | |
| LA2 | attendance, journal | Faculty | Marks Submission at the end of Week 12 | 30 | | | | | | |
| Lab ESE | Lab activities, | Lab Course | During Week 15 to Week 18 | 40 | | | | | | |
| | attendance, journal | Faculty | Marks Submission at the end of Week 18 | 40 | | | | | | |

Week 1 indicates starting week of a semester. The typical schedule of lab assessments is shown, considering a 26-week semester. The actual schedule shall be as per academic calendar. Lab activities/Lab performance shall include performing experiments, mini-project, presentations, drawings, programming and other suitable activities, as per the nature and requirement of the lab course. The experimental lab shall have typically 8-10 experiments.

| Assessment Plan based on Bloom's Taxonomy Level | | | | | | | | | |
|---|-----|-----|---------|-------|--|--|--|--|--|
| Bloom's Taxonomy Level | LA1 | LA2 | Lab ESE | Total | | | | | |
| Remember | | | | | | | | | |
| Understand | | | | | | | | | |
| Apply | 20 | 15 | 20 | 55 | | | | | |
| Analyze | 10 | 10 | 10 | 30 | | | | | |
| Evaluate | | 5 | 10 | 15 | | | | | |
| Create | | | | | | | | | |
| Total | 30 | 30 | 40 | 100 | | | | | |

GROUP A SEM-I

| Course Name | Theory | Tutorial | LAB. Hrs. | Credits | Category |
|----------------------------|--------|----------|-----------|---------|----------|
| | Hrs. | HRs | | | |
| Engineering Physics | 3 | | | 3 | BS |
| Engineering Mathematics- I | 3 | 1 | | 4 | BS |
| Engineering Mechanics | 3 | | | 3 | ES |
| Communication Skills | 2 | 1 | | 3 | HS |
| Programming For Problem | 2 | | | 2 | BS |
| Solving | | | | | |
| Engineering Mechanics Lab. | | | 2 | 1 | ES |
| Workshop Practice | | | 2 | 1 | ES |
| Programming For Problem | | | 2 | 1 | ES |
| Solving Lab. | | | | | |
| Physics Lab. | | | 2 | 1 | BS |
| TOTAL | 13 | 2 | 8 | 19 | |

GROUP A SEM-II

| Course Name | Theory Hrs | Tutorial HBs | LAB. Hrs. | Credits | Category |
|-----------------------------------|---------------------------------------|-----------------|-----------|---------|----------|
| Engineering Chemistry | · · · · · · · · · · · · · · · · · · · | 111.5 | | 2 | DC |
| Engineering Chemistry | 5 | | | 5 | ВЗ |
| Engineering Mathematics- II | 3 | 1 | | 4 | BS |
| Engineering Graphics and | 2 | | | 2 | ES |
| AutoCAD | | | | | |
| Basic Electrical Engineering | 3 | | | 3 | ES |
| Arduino Based System | 2 | | | 2 | ES |
| Life Science | 2 | | | 2 | HS |
| Engineering Graphics and | | | 2 | 1 | ES |
| AutoCAD Lab. | | | | | |
| Basic Electrical Engineering Lab. | | | 2 | 1 | ES |
| Chemistry Lab. | | | 2 | 1 | BS |
| Arduino Based System Lab. | | | 2 | 1 | ES |
| TOTAL | 15 | 1 | 8 | 20 | |

GROUP B SEM-I

| Course Name | Theory | Tutorial | LAB. Hrs. | Credits | Category |
|-----------------------------------|---------------------------------------|----------|-----------|---------|----------|
| Engineering Chemistry | · · · · · · · · · · · · · · · · · · · | 111.5 | | 2 | DC |
| Engineering Chemistry | 3 | | | 3 | BS |
| Engineering Mathematics- I | 3 | 1 | | 4 | BS |
| Engineering Graphics and | 2 | | | 2 | ES |
| AutoCAD | | | | | |
| Basic Electrical Engineering | 3 | | | 3 | ES |
| Arduino Based System | 2 | | | 2 | ES |
| Life Science | 2 | | | 2 | HS |
| Engineering Graphics and | | | 2 | 1 | ES |
| AutoCAD Lab. | | | | | |
| Basic Electrical Engineering Lab. | | | 2 | 1 | ES |
| Chemistry Lab. | | | 2 | 1 | BS |
| Arduino Based System Lab. | | | 2 | 1 | ES |
| TOTAL | 15 | 1 | 8 | 20 | |

GROUP B SEM-II

| Course Name | Theory | Tutorial | LAB. Hrs. | Credits | Category |
|-----------------------------|--------|----------|-----------|---------|----------|
| | Hrs. | HRs | | | |
| Engineering Physics | 3 | | | 3 | BS |
| Engineering Mathematics- II | 3 | 1 | | 4 | BS |
| Engineering Mechanics | 3 | | | 3 | ES |
| Communication Skills | 2 | 1 | | 3 | HS |
| Programming For Problem | 2 | | | 2 | BS |
| Solving | | | | | |
| Engineering Mechanics Lab. | | | 2 | 1 | ES |
| Workshop Practice | | | 2 | 1 | ES |
| Programming For Problem | | | 2 | 1 | ES |
| Solving Lab. | | | | | |
| Physics Lab. | | | 2 | 1 | BS |
| TOTAL | 13 | 2 | 8 | 19 | |