PAAVAI ENGINEERNG COLLEGE (Autonomous) M.E. - ENGINEERING DESIGN

REGULATIONS 2023 (CHOICE BASED CREDIT SYSTEM)

CURRICULUM

(For the candidates admitted during the Academic Year 2023-24) SEMESTER - I

| S.No. | Category | Course Code | Course Title | L | T | P | C |
|---------|----------|-------------|---|----|------|---|----|
| Theory | Y | | | | - 43 | | |
| 1 | PC | PED23101 | Advanced Engineering Materials | 3 | 0 | 0 | 3 |
| 2 | PC | PED23102 | Concepts of Engineering Design | 3 | 0 | 0 | 3 |
| 3 | PC | PED23103 | Computer Applications in Design | 3 | 0 | 0 | 3 |
| 4 | PC | PED23104 | Vibration Analysis and Control | 3 | 1 | 0 | 4 |
| 5 | MC | PEN23101 | Research Methodology and IPR | 3 | 0 | 0 | 3 |
| 6 | PE | PED23*** | Professional Elective I | 3 | 0 | 0 | 3 |
| 7 | AC | PAC23101 | English for Research Paper Writing (Audit Course I) | 2 | 0 | 0 | 0 |
| Practic | cal | | | | | | |
| 1 | PC | PED23105 | Computer Aided Design Laboratory | 0 | 0 | 4 | 2 |
| | | To | OTAL | 20 | 1 | 4 | 21 |

SEMESTER - II

| S.No. | Category | Course Code | Course Title | L | T | P | C |
|--------|----------|-------------|---|----|---|---|----|
| Theor | у | | | | | | |
| 1 | PC | PED23201 | Finite Element Methods in Mechanical Design | 3 | 1 | 0 | 4 |
| 2 | PC | PED23202 | Integrated Product Development | 3 | 0 | 0 | 3 |
| 3 | PC | PED23203 | Mechanical Behavior of Materials | 3 | 0 | 0 | 3 |
| 4 | PC | PED23204 | Advanced Mechanics of Materials | 3 | 1 | 0 | 4 |
| 5 | PE | PED23*** | Professional Elective II | 3 | 0 | 0 | 3 |
| 6 | PE | PED23*** | Professional Elective III | 3 | 0 | 0 | 3 |
| 7 | AC | PAC23201 | Pedagogy Studies (Audit Course II) | 2 | 0 | 0 | 0 |
| Practi | cal | | reson in and Marketine | | | | |
| 1 | PC | PED23205 | Simulation and Analysis Laboratory | 0 | 0 | 4 | 2 |
| | | | TOTAL | 20 | 2 | 4 | 22 |

CINEERING COLLEGE
Approved
BOARD OF STUDIES
Mechanical Engineering
AUTONOMOUS

AUTONOMOUS

SEMESTER - III

| S.No. | Category | Course Code | Course Title | L | T | P | С |
|---------|----------|-------------|--------------------------------|----|---|----|----|
| Theory | r | | | | | | |
| 1 | PC | PED23301 | Engineering Fracture Mechanics | 3 | 0 | 0 | 3 |
| 2 | PE | PED23*** | Professional Elective IV | 3 | 0 | 0 | 3 |
| 3 | PE | PED23*** | Professional Elective V | 3 | 0 | 0 | 3 |
| 4 | OE | PED23*** | Open Elective | 3 | 0 | 0 | 3 |
| Practic | al | | | | | | |
| 1 | EE | PED23302 | Project Work (Phase I) | 0 | 0 | 12 | 6 |
| | | | TOTAL | 12 | 0 | 12 | 18 |

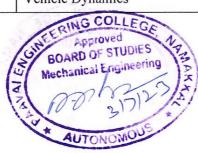
$\mathbf{SEMESTER} - \mathbf{IV}$

| S.No. | Category | Course Code | Course Title | L | T | P | С |
|---------|----------|-------------|-------------------------|---|---|----|----|
| Practic | al | | | | | | |
| 1 | EE | PED23401 | Project Work (Phase II) | 0 | 0 | 24 | 12 |
| | | | TOTAL | 0 | Ô | 24 | 12 |

TOTAL CREDITS: 21+22+18+12=73

PROFESSIONAL ELECTIVE COURSES

| S.No. | Category | Course Code | Course Title | L | T | P | С |
|-------|----------|-------------|---|---|---|---|---|
| 1. | PE | PED23151 | Design for Sustainability | 3 | 0 | 0 | 3 |
| 2. | PE | PED23152 | Mechanics of Composite Materials | 3 | 0 | 0 | 3 |
| 3. | PE | PED23153 | Design of Hydraulic and Pneumatic Systems | 3 | 0 | 0 | 3 |
| 4. | PE | PED23154 | Tribology in Design | 3 | 0 | 0 | 3 |
| 5. | PE | PED23155 | Advanced Mechanisms in Design | 3 | 0 | 0 | 3 |
| 6. | PE | PED23156 | Product Lifecycle Management | 3 | 0 | 0 | 3 |
| 7. | PE | PED23157 | Surface Engineering | 3 | 0 | 0 | 3 |
| 8. | PE | PED23158 | Optimization Techniques in Design | 3 | 0 | 0 | 3 |
| 9. | PE | PED23159 | Mechanical Measurements and Analysis | 3 | 0 | 0 | 3 |
| 10. | PE | PED23160 | Design for X | 3 | 0 | 0 | 3 |
| 11. | PE | PED23161 | Vehicle Dynamics | 3 | 0 | 0 | 3 |



| S.No | Category | Course Code | Course Title | L | T | P | С |
|------|----------|-------------|--|---|---|---|---|
| 12. | PE | PED23162 | Wearable Technologies | 3 | 0 | 0 | 3 |
| 13. | PE | PED23163 | Solid Freeform Manufacturing | 3 | 0 | 0 | 3 |
| 14. | PE | PED23164 | Bio Materials | 3 | 0 | 0 | 3 |
| 15. | PE | PED23165 | Advanced Finite Element Analysis | 3 | 0 | 0 | 3 |
| 16. | PE | PED23166 | Design of Hybrid and Electric Vehicles | 3 | 0 | 0 | 3 |
| 17. | PE | PED23167 | Bearing Design and Rotor Dynamics | 3 | 0 | 0 | 3 |
| 18. | PE | PED23168 | Material Handling Systems and Design | 3 | 0 | 0 | 3 |
| 19. | PE | PED23169 | Artificial Intelligence and Machine Learning | 3 | 0 | 0 | 3 |
| 20. | PE | PED23170 | Industrial Internet of Things | 3 | 0 | 0 | 3 |

OPEN ELECTIVE COURSES

| S. No | Category | Course Code | Course Title | L | T | P | С |
|-------|----------|-------------|-------------------------------|---|---|---|---|
| 1 | OE | PED23901 | Industrial Safety | 3 | 0 | 0 | 3 |
| 2 | OE | PSE23901 | Climate change and Adaptation | 3 | 0 | 0 | 3 |
| 3 | OE | PPS23901 | Alternate Energy Sources | 3 | 0 | 0 | 3 |
| 4 | OE | PCS23901 | Design of Digital Elements | 3 | 0 | 0 | 3 |
| 5 | OE | PCE23901 | Big Data Analytics | 3 | 0 | 0 | 3 |

SPECIAL ELECTIVE COURSES

| S. No | Category | Course Code | Course Title | L | T | P | С |
|-------|----------|-------------|---------------------------------------|---|---|---|---|
| 1 | SPE | PMR23001 | Materials Characterization Techniques | 3 | 0 | 0 | 3 |
| 2 | SPE | PMR23002 | Composite Materials and Testing | 3 | 0 | 0 | 3 |
| 3 | SPE | PMR23003 | Soft Computing | 3 | 0 | 0 | 3 |



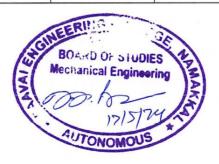
| PE | D2330 | 1 | | EN | GINEE | ERING | FRACT | TURE I | MECHA | NICS | | | 3 | 0 | 0 |
|---|--|--|--|--|---|--|---|--|--|--|---------------------------------------|---|--|--|----------------------|
| CO | URSE | OB | JECTIVES | 3 | | | | | | | | | | | |
| То | enable | the | students to | | | | | | - | | | | | | |
| 1. | get fa | milia | ar with the i | nechanis | sms of fr | fracture | and crac | ick grow | th. | | | | | | |
| 2. | know | abo | ut the elasti | c crack-ti | ip stress | s field a | and crack | k tip pla | stic zone | e. | | | | | |
| 3. | under | stan | d the energ | y princip | ole invol | lving cr | rack grov | wth and | crack- r | esistano | e. | | | | |
| 4. | gain k | cnow | ledge on e | lastic cra | ck-tip st | stress fi | ield and o | crack tip | plastic | zone. | | | | | |
| 5. | learn | the n | nechanism (| of fatigu | ie crack | c propag | gation. | | | | | | | | |
| UN | ITI | M | IECHANIS | MS OF | FRAC | CTURE | AND C | CRACK | GROW | TH | | | | | |
| anal | lysis. | | leavage fra | | | | | | | | | | | rvice | e fa |
| | IT II | | LASTIC C | | | | | | | | | | | | |
| | | | s function-C | | | | | | | | he effect | t of fini | te siz | ze-Tl | he I |
| | | | rrection-The | | | | ne shape | of the p | lastic zo | ne. | | | | | |
| | III TI | T | HE ENER | GY PRI | NCIPLI | .F. | | | | | | | | | |
| | | | | | | | | | | | | | | 3 | |
| | | | ease rate-Th | | | | owth-Th | he crack | resistan | ce (R cı | ırve)-Co | mpliano | e-Tl | ne J i | inte |
| Tea | ring mo | odulı | us-Stability. | | on for cr | crack gr | | he crack | resistan | ce (R cı | irve)-Co | mpliano | ce-Tl | ne J i | inte |
| Team | ring mo | odulı E | us-Stability. LASTIC-P | LASTIC | on for cr | crack gro | E | | | | | | | | |
| Team UNI Frac | ring mo | El eyon | us-Stability. LASTIC-P nd general | LASTIC | on for cr | CTURE | E pening d | displacer | nent-Th | e possil | ole use | of the | СТО | DD ci | riter |
| UNI Frac Exp | ring mo IT IV cture b erimen | E) eyon | us-Stability. LASTIC-P nd general : | LASTIC yield-The | on for cr C FRAC e crack | CTURE c tip op | E pening d ers affect | displacer | nent-The | e possil | ole use o | of the | СТО | DD ci | riter |
| Team UNI Frac Exp yield | ring mo IT IV cture b erimen d-Use o | Ell eyon tal do f the | us-Stability. LASTIC-P nd general ge | LASTIC yield-Tho n of CT Limitatio | on for cr C FRAC e crack TOD-Par ons of th | CTURE c tip op | E pening d ers affect tegral-M | displacer | nent-The | e possil | ole use o | of the | СТО | DD ci | riter |
| UNI Frac Exp yield UNI | ring mo | eyon tal dof the | LASTIC-P and general y determination 1 integral- | LASTIC yield-Tho n of CT Limitation | C FRACE crack TOD-Partons of the PROPA | CTURE c tip op arameter the 1 int | E pening d ers affect tegral-M | displacer ting the deasuren | ment-The critical nent of J | e possil CTOD | ole use o | of the ions, fra | CTO | DD cre at | riter ger |
| Team UNI Frace Exp yield UNI Intro | ring more true between the control of the control o | eyon tal d of the | LASTIC-P and general y letermination e 1 integral- ATIGUE C | LASTIC yield-The n of CT Limitatio RACK I | C FRACE e crack TOD-Part ons of the PROPA | CTURE c tip op arameter the 1 int AGATI | E pening d ers affect tegral-M ION ty factor- | displacer ting the feasuren -Factors | nent-The critical nent of J | e possil CTOD | ole use o | of the ions, fra | CTO | DD cre at | riter ger |
| Team UNI Frace Exp yield UNI Intro | ring more true between the control of the control o | eyon tal d of the | LASTIC-P and general y determination 1 integral- | LASTIC yield-The n of CT Limitatio RACK I | C FRACE e crack TOD-Part ons of the PROPA | CTURE c tip op arameter the 1 int AGATI | E pening d ers affect tegral-M ION ty factor- | displacer ting the feasuren -Factors | nent-The critical nent of J | e possil CTOD | ole use of Limitating Closure propaga | of the ions, fra | CTO actur | DD cre at | riter ger |
| Team UNI Frace Exp yield UNI Intro serv | ring more true between the control of the control o | eyon tal d of the | LASTIC-P Ind general | LASTIC yield-The n of CT Limitatio RACK I | C FRACE e crack TOD-Part ons of the PROPA | CTURE c tip op arameter the 1 int AGATI | E pening d ers affect tegral-M ION ty factor- | displacer ting the feasuren -Factors | nent-The critical nent of J | e possil CTOD | ole use o | of the ions, fra | CTO actur | DD cre at | riter ger |
| Tean UNI Frac Exp yield UNI Intro serv | ring months and the control of the c | eyonntal ding- | LASTIC-P Ind general | LASTIC yield-The on of CT Limitation RACK I and the | e crack COD-Par ons of th PROPA stress in | CTURE c tip operameter the 1 intensity intensity | E pening d ers affect tegral-M ION ty factor- mall crac | displacer ting the feasuren -Factors | nent-The critical nent of J | e possil CTOD | ole use of Limitating Closure propaga | of the ions, fra | CTO actur ariab | DD cre at | riter ger mpli |
| Team UNI Frace Exp yield UNI Intro serv | tring months of the control of the c | eyon ttal d FA OUT of the | LASTIC-P Ind general | LASTIC yield-The yield-The on of CT Limitation RACK I and the n models | c FRAC e crack COD-Par ons of th PROPA stress in s-Similit | CTURE c tip operameter the 1 intensity intensity itude-Sn | E pening d ers affect tegral-M ION ty factor- mall crac | displacer ting the feasuren -Factors | nent-The critical nent of J | e possil CTOD | ole use of Limitating Closure propaga | of the ions, fra | CTO actur | DD cree at | riter ger mpli |
| Team UNI Frace Exp yield UNI Intro serv COI At the | ring more true between the control of the control o | eyon ttal d FA of the OUT of the xplain | LASTIC-P and general | LASTIC yield-The n of CT Limitatio RACK I and the n models | e crack TOD-Par ons of the PROPA stress in s-Similit ts will b | CTURE c tip operated the 1 intensity itude-Snumber able gue crace | pening ders affect tegral-M ION Ty factor-mall crace to cking. | displacer ting the feasuren -Factors cks-Clos | nent-The critical nent of J affectinure. | e possil CTOD IC and J Ig crack | ple use of Limitating Closure propaga | of the sions, frage. ation-Va | CTO actur ariab | DD cree at | riter ger mpli |
| Team UNI Frace Exp yield UNI Intro serv | tring modern tring modern tring modern tripe of the control of the | eyon ttal d of the on-Cr dings OUT of th | LASTIC-P Ind general | LASTIC yield-The n of CT Limitatio RACK I and the n models | e crack TOD-Par ons of the PROPA stress in s-Similit ts will b | CTURE c tip operated the 1 intensity itude-Snumber able gue crace | pening ders affect tegral-M ION Ty factor-mall crace to cking. | displacer ting the feasuren -Factors cks-Clos | nent-The critical nent of J affectinure. | e possil CTOD IC and J Ig crack | ple use of Limitating Closure propaga | of the sions, frage. L PERI BT M (High | CTO actur ariabi CODS IAPI est L | DD cre at le an | riter ger mpli |
| Tean UNI Frace Exp yield UNI Intro serv CO1 At tll CO2 | ring moderate between the control of | eyon ttal d of the property of the of the of the property of t | LASTIC-P Ind general integral- ATIGUE Corack growth Retardation TCOMES TE course, the in Ductile fithe crack in the c | LASTIC yield-The n of CT Limitatio RACK I and the n models e student racture ar | e crack TOD-Par ons of the PROPA stress in s-Similit ts will b and Fatig | CTURE c tip operate the 1 intensity itude-Snumber able gue crace di to ela | pening ders affect tegral-M ION Ty factor-mall crace to cking. | displacer ting the feasuren r-Factors cks-Clos | nent-The critical nent of J affectinure. | e possil CTOD IC and J Ig crack d and c | Propaga | of the fions, frage. L PERI BT M (High | CTO actur ariab IODS IAPI est L rstan | DD cre at le an le an le en le evel ding (K3) | riter ger mpli |
| Team UNI Frace Exp yield UNI Intro serv COI At the | tring modern tring modern tring modern triple to the control of th | eyon ttal d of the FA on-Cr ding OUT | LASTIC-P Ind general | LASTIC yield-The n of CT Limitatio RACK I and the n models e student racture ar problems | e crack COD-Par ons of the PROPA stress in s-Similit ts will b and Fatig s related e rate ar | CTURE c tip op arameter the 1 int AGATI intensity itude-Sn be able gue crac d to ela | pening ders affect tegral-M ION ty factor-mall crace to cking. astic crace | displacer ting the feasuren -Factors cks-Clos | affectinure. | e possil CTOD IC and J Ig crack d and c | Propaga | of the cions, frage. L PERI BT M (High Under | CTO actur ariab IAPI est L rstan | DD cree at leanning l | riter ger mpli |

- 2. Prashant Kumar, "Elements of Fracture Mechanics", Tata McGraw-Hill Publishing Company Ltd, 2009
- 3. Tribikram Kundu, "Fundamentals of Fracture Mechanics", Ane Books Pvt. Ltd. New Delhi/ CRC Press, 1st Indian Reprint, 2012
- 4. Ted L. Anderson, "Fracture Mechanics: Fundamentals and Applications", CRC Taylor and Francis, 4th Edition, 2017.
- 5. John M.Barson and Stanely T.Rolfe, "Fatigue and fracture control in structures", Butterworth-Heinemann; 3rd edition. 2010.

CO - PO MAPPING

Mapping of Course Outcomes with Programme Outcomes: (1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

| COs | Programme Outcomes(POs) | | | | | | | | | | |
|-----|-------------------------|-----|-----|-----|-----|-----|--|--|--|--|--|
| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | | | | | |
| C01 | 3 | 3 | 2 | 2 | 2 | - | | | | | |
| CO2 | 3 | 3 | • | - | 2 | 2 | | | | | |
| CO3 | 3 | - | 2 | - | 2 | 2 | | | | | |
| CO4 | 3 | 3 | 2 | 2 | 2 | - | | | | | |
| C05 | 2 | 2 | 2 | 2 | 3 | - | | | | | |



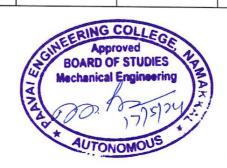
| PEI | 023302 | | PR | ROJECT WORK | (PHASE I) | | 0 | 0 | 12 | 6 |
|-------|--------------|-----------|----------------------|---|----------------------|---------------|-------------|-------|---------|------|
| CO | URSE OBJ | ECTIV | ES | | | | | | | |
| То | enable the s | tudents t | 0 | | | | | | | |
| 1. | enhance su | ıfficient | hands-on learning | experience relate | d to the design, de | evelopment a | and analys | sis o | f suit | able |
| | product / p | rocess | | | | | | | | |
| 2. | develop the | e technic | al skill sets in the | chosen field and a | lso to accustom to | research orie | entation. | | | |
| 3. | develop the | e method | lology to solve the | identified problem | n. | | | | | |
| 4. | train the st | udents in | preparing project | reports and to face | e reviews and viva | -voce exami | nation. | | | |
| SYL | LABUS | | | | | | | | | |
| The | student ind | ividually | works on a spec | ific topic approved | d by the head of the | ne division u | nder the | guid | ance | of a |
| facu | lty member | who is f | amiliar in this area | of interest. The st | udent can select ar | y topic whic | h is releva | int t | o the a | area |
| | | | | eoretical or case s | | | | | | |
| the v | work done | should b | e submitted which | n contains clear de | efinition of the ide | entified prob | lem, deta | led | literat | ture |
| revie | w related t | o the ar | ea of work and m | ethodology for ca | arrying out the wo | ork. The stud | lents will | be o | evalua | ated |
| throu | ıgh a viva-v | oce exa | mination by a pane | el of examiners inc | cluding one extern | al examiner. | | | | |
| | | | | | | TOTAL | PERIOD | S: | 18 | 0 |
| COI | JRSE OUT | COME | S | | | T | BT MAP | PE |) | |
| At th | e end of the | e course, | the students will I | be able to | | | (Highest | Leve | el) | |
| COI | confron | t challen | ging practical prol | olem and explore s | solution by proper | procedure | Understa | ndin | g (K2 |) |
| | using th | e technic | al knowledge and | professional appro | oach. | | | | | |
| CO2 | conduct | experim | ents / Design and | Analysis / solution | iterations and doc | cument the | Applying | (K3 | () | |
| CO3 | | | m of technical rep | ort / presentation. formulation and so | lution | | A 1 | (IV 2 | | |
| CO4 | | | | nplex problems ut | | | Applying | | | |
| | PO MAP | | ing solutions to col | inplex problems ut | msing a systems a | pproach | Applying | (K3 |) | |
| | TOWNE | 1110 | Manning of Co | urse Outcomes wi | th Dragramma Ou | | | | | |
| | | (1/2 | | gth of correlation | | | ak | | | |
| | | - | | | outcomes(POs) | , ~ , / 0 | | | | |
| COs | | | | | | | | | | |
| | PC |)1 | PO2 | PO3 | PO4 | PO5 | | F | 06 | |
| COs | PC 2 | | PO2 2 2 | PO3 3 | PO4 2 | PO5 2 | | F | 2 | |



CO3

CO4

| | 23401 | | DJECT WORK (I | PHASE II) | | 0 | 0 | 24 | 12 |
|--------------------------|--|---|--|--|--|--------------------------------------|------------------------|------------------------------------|--------|
| COL | JRSE OBJECTIV | ES | | | | | | | |
| To e | nable the students t | 0 | | | | | | | |
| 1. | the project work sh | all be based on the | e knowledge acqu | ired by the stud | lent during the | course a | nd p | referal | bly it |
| | should meet and co | ntribute towards th | ne needs of the soo | ciety | | | | | |
| 2. | the project aims to | provide an opportu | unity of designing | and building co | mplete system | or subsy | sten | ns base | ed on |
| ; | area where the stud | ents like the acqui | re specialized skil | ls. | | | | | |
| 3. | solve the identified | problem based on | the formulated me | ethodology. | | ** | | | |
| 4. | develop skills to an | alyze and discuss t | the test results, and | d make conclus | ions. | | | | |
| SYL | LABUS | | | | | | | | |
| The s | student should cont | inue the phase I w | ork on the selecte | ed topic as per | the formulated | methodo | ology | unde | r the |
| same | supervisor. At the | end of the semes | ter, after completi | ing the work to | the satisfactio | n of the | supe | ervisor | r and |
| revie | w committee, a deta | ailed report should | l be prepared and | submitted to the | e head of the de | epartmer | nt. Tl | he stud | dents |
| will t | be evaluated based | on the report subn | nitted and the viva | -voce examina | tion by a panel | of exam | iner | s inclu | ıding |
| one e | xternal examiner. | | | | | | | | |
| | | | | | TOTAL | PEDIOI | 19. | 36 | 50 |
| | | | | N. | | LIMOI | ا ۱۰۰ | 30 | 00 |
| COU | RSE OUTCOME | S | | | | BT MA | -1300 90 | | |
| | RSE OUTCOME e end of the course, | | be able to | | | | APPI | ED | |
| At th | e end of the course, | the students will be project work, th | e students will be | | o take up any | BT MA | APPI st Le | E D vel) | |
| At the | completion of the challenging pra | the students will be project work, the ctical problems | e students will be and find solution | on by formul | o take up any ating proper | BT MA | APPI st Le | E D vel) | |
| At the | completion of the challenging pra methodology apply engineering | the students will be project work, the ctical problems | e students will be and find solution | on by formul | o take up any ating proper handling of | BT MA | APPI st Le | E D vel) ing (K | |
| At the | completion of the challenging pra methodology apply engineering project have a clean | the students will be project work, the ctical problems and managemear idea of his/her | e students will be and find solution | on by formul | o take up any ating proper handling of | BT MA (Highes | APPI st Le | E D vel) ing (K | |
| | completion of the challenging pra methodology apply engineerin project have a clout the work in a | the students will be project work, the ctical problems and managemear idea of his/her | e students will be and find solution ent principles the area of work and t | on by formul | take up any ating proper handling of sition to carry | BT MA (Highes Unders | APPI st Le tandi | ED vel) ing (K | |
| At the CO1 | completion of the challenging pra methodology apply engineering project have a cleout the work in a design engineering demonstrate the | the students will be project work, the ctical problems and management idea of his/her a systemic waying solutions to corknowledge, skills | e students will be and find solution ent principles the area of work and the mplex problems ut | on by formul rough efficient they are in a postilising a system professional en | take up any ating proper handling of sition to carry as approach gineer to take | BT MA (Highes | APPI st Le tandi | ED vel) ing (K | |
| At the | completion of the challenging pra methodology apply engineering project have a clout the work in a design engineering demonstrate the up any challenging complete the contract of the contract | the students will be project work, the ctical problems and management idea of his/her a systemic waying solutions to conknowledge, skills and practical problems | e students will be and find solution ent principles the area of work and the mplex problems ut | on by formul rough efficient they are in a postilising a system professional en | take up any ating proper handling of sition to carry as approach gineer to take | BT MA (Highes Unders Applyin | APPI st Le tandi | ED vel) ing (K | |
| At the CO1 CO2 CO3 CO4 | completion of the challenging pra methodology apply engineerin project have a cle out the work in a design engineeric demonstrate the up any challenging better solutions to | the students will be project work, the ctical problems and management idea of his/her a systemic waying solutions to conknowledge, skills and practical problems | e students will be and find solution ent principles the area of work and the mplex problems ut | on by formul rough efficient they are in a postilising a system professional en | take up any ating proper handling of sition to carry as approach gineer to take | BT MA (Highes Unders Applyin | APPI st Le tandi | ED vel) ing (K | |
| At the CO1 CO2 CO3 CO4 | completion of the challenging pra methodology apply engineering project have a clout the work in a design engineering demonstrate the up any challenging complete the contract of the contract | the students will be project work, the ctical problems and management idea of his/her a systemic way and solutions to conknowledge, skills and practical problems it. | e students will be and find solution ent principles the area of work and to applex problems ut and attitudes of a period of | rough efficient they are in a pos- cilising a system professional engineering de | b take up any ating proper handling of sition to carry as approach gineer to take sign and find | BT MA (Highes Unders Applyin | APPI st Le tandi | ED vel) ing (K | |
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| CO2 CO3 CO4 | completion of the challenging pramethodology apply engineering project have a cleout the work in a design engineering demonstrate the up any challenging better solutions to the complete solution to the complete | the students will be project work, the ctical problems and management idea of his/her a systemic waying solutions to conknowledge, skills and practical problems it. | e students will be and find solution ent principles the area of work and to a mplex problems ut and attitudes of a gem in the field of ourse Outcomes with of correlation | rough efficient they are in a postilising a system professional engineering de | b take up any ating proper handling of sition to carry as approach gineer to take sign and find | BT MA (Highes Unders Applyin Applyin | APPI st Le tandi | ED vel) ing (K | |
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| CO2 CO3 CO4 CO - COs CO1 | completion of the challenging pramethodology apply engineering project have a clout the work in a design engineering demonstrate the up any challenging better solutions to the polymer. PO MAPPING (1/2/PO) PO1 2 | the students will be project work, the ctical problems and management idea of his/her a systemic way ng solutions to correct knowledge, skills and practical problem it. Mapping of Co it. PO2 3 | e students will be and find solution ent principles the area of work and to a mplex problems ut and attitudes of a period of the correlation area of correlation and correlation area of correlation and correlation area of correlation area of correlation area of correlation and correlation area of correlation area of correlation area of correlation and correlation area of correlation area of correlation and correlation area of correlation and correlation area of correlation area of correlation area of correlation and correlation area of correlation area. | rough efficient they are in a postilising a system professional engineering de (th Programme) 3-Strong, 2-Noutcomes(POs) | take up any ating proper handling of sition to carry as approach gineer to take sign and find Outcomes: Medium, 1-We | BT MA (Highes Unders Applyin Applyin | APPI st Le tandi | ED vel) ing (K | |
| At the CO1 CO2 CO3 CO4 | completion of the challenging praymethodology apply engineering project have a clayout the work in a design engineering demonstrate the up any challenging better solutions to the project have a clayout the work in a design engineering demonstrate the up any challenging better solutions to the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the work in a design engineering the project have a clayout the pro | the students will be project work, the ctical problems and management idea of his/her a systemic waying solutions to conknowledge, skills and practical problems it. Mapping of Cooks indicates streng | e students will be and find solution of the so | rough efficient they are in a postilising a system professional engineering de other programme of the Progra | b take up any ating proper handling of sition to carry as approach gineer to take sign and find Outcomes: Medium, 1-We | BT MA (Highes Unders Applyin Applyin | APPI st Le tandi | ED vel) ing (K (33) (33) (33) (79) | |



CO4

| PE | D23901 | INDUSTRIAL SAFETY | 3 | 0 | 0 | 3 | | | |
|--------------|--|---|--------|--------|-------|-------|--|--|--|
| CC | OURSE (| DBJECTIVES | | | | | | | |
| To | enable t | he students to | | | | | | | |
| 1. | give exposure to various industrial safety equipment's and methods. | | | | | | | | |
| 2. | understand tools used for maintenance cost and services life of equipment. | | | | | | | | |
| 3. | analyz | analyze the types, causes, effects of wear reduction methods. | | | | | | | |
| 4. | | ce awareness of fault tracing concept and maintenance and types of faults in machine tools and their al causes. | | | | | | | |
| 5. | develo | o rudimentary ability on periodic inspection concept and needs of various mechanical tent's. | l and | elec | trica | al | | | |
| UN | ITI | INDUSTRIAL SAFETY | | | | 9 | | | |
| Acc | cident, c | auses, types, results and control, mechanical and electrical hazards, types, cause | es an | d pr | eve | ntive | | | |
| step | os/proced | lure, describe salient points of factories act 1948 for health and safety, wash room | ıs, dı | inkir | ng v | vater | | | |
| layo | outs, ligh | t, cleanliness, fire, guarding, pressure vessels, etc., Safety color codes. Fire preventio | n and | l fire | figh | ting, | | | |
| equ | ipment a | and methods. | | | | | | | |
| UNIT II FUND | | FUNDAMENTALS OF MAINTENANCE ENGINEERING | | T | | 9 | | | |
| Def | finition a | nd aim of maintenance engineering, Primary and secondary functions and responsibili | ty of | mair | nten | ance | | | |
| | | Types of maintenance, Types and applications of tools used for maintenance, Main | tenan | ice co | ost d | & its | | | |
| rela | tion witl | replacement economy, Service life of equipment. | | | | | | | |
| UN | II III | WEAR AND CORROSION AND THEIR PREVENTION | . 1 | | | 9 | | | |
| | | s, causes, effects, wear reduction methods, lubricants-types and applications, Lub | | | | 0.50 | | | |
| gen | eral sket | ch, working and applications, i. Screw down grease cup, ii. Pressure grease gun, iii. S | plasl | h lub | rica | tion, | | | |
| iv. (| Gravity 1 | ubrication, v. Wick feed lubrication vi. Side feed lubrication, vii. Ring lubrication, De | finiti | ion, p | orino | ciple | | | |
| and | factors | affecting the corrosion. Types of corrosion, corrosion prevention methods. | | | | | | | |
| UN | IT IV | FAULT TRACING | | | | 9 | | | |
| Fau | lt tracin | g-concept and importance, decision tree concept, need and applications, sequence | e of | fault | -fin | ding | | | |
| acti | vities, s | now as decision tree, draw decision tree for problems in machine tools, hydr | aulic | , pne | eum | atic, | | | |
| auto | omotive, | thermal and electrical equipment's like, i. Any one machine tool, ii. Pump iii. Ai | r coi | npre | ssor | , iv. | | | |
| Inte | | abustion engine, v. Boiler, vi. Electrical motors, Types of faults in machine tools | and | their | gen | eral | | | |
| | IT V | PERIODIC AND PREVENTIVE MAINTENANCE | | - | | 9 | | | |
| | | pection-concept and need, degreasing, cleaning and repairing schemes, overhauling | ng of | f me | char | | | | |
| | | overhauling of electrical motor, common troubles and remedies of electric motor, re | | | | | | | |
| 1 | • | 1 7 1.1 | pall | comp | JICX | ities | | | |

and its use, definition, need, steps and advantages of preventive maintenance. Steps/procedure for periodic and preventive maintenance of: I. Machine tools, ii. Pumps, iii. Air compressors, iv. Diesel generating (DG) sets,

Program and schedule of preventive maintenance of mechanical and electrical equipment, advantages of preventive maintenance. Repair cycle concept and importance.

| | | TOTAL PER | HODS: | 45 |
|--|---|---------------------|--------------------|--------|
| COURSE OUTCOMES | | | BT MAPPED | |
| At the end of the course, the students will be able to | | | (Highest Level) | |
| CO1 | differentiate the types of accident causes and preventive steps of inc | ustrial safety. Und | erstandin | g (K2) |
| CO2 | assess the various types and applications of tools used for mainterelation with economy. | nance and its Und | Understanding (K2) | |
| CO3 | analyze the factors affect the corrosion and its prevention methods. | Und | erstandin | g (K2) |
| CO4 | identify the types of faults in machine tools and their general causes | s. App | lying (K3 | 3) |
| CO5 | analyze the various preventive maintenance of mechanical and elected equipment's and repair cycle concepts. | trical App | lying (K3 | 3) |

REFERENCES

- 1. Foundation Engineering Handbook, Hans F.Winterkorn, Hsai-yang fang, Chapman & Hall publishers London 2010.
- 2. Pump-hydraulic Compressors, Audels, Tata MC Graw hill Publication 2003.
- 3. Industrial Maintenance, H. P. Garg, S. Chand Ltd., Reprint 2010.
- 4. Maintenance Engineering Handbook, Higgins & Morrow, Tata MC Graw hill 2012.
- Principles of Industrial Safety Management Understanding the Ws of Safety at Work, "Das Akhil Kumar", January 2020.

CO - PO MAPPING

Mapping of Course Outcomes with Programme Outcomes:

(1/2/3 indicates strength of correlation) 3-Strong, 2-Medium, 1-Weak

| CO | Programme Outcomes(POs) | | | | | | |
|-----|-------------------------|-----|-----|-----|-----|-----|--|
| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | |
| CO1 | 3 | - | 2 | - | - | 3 | |
| CO2 | 3 | 2 | 2 | 3 | - 1 | 2 | |
| CO3 | 3 . | 3 | 2 | 3 | 3 | 3 | |
| CO4 | 3 | 3 | 2 | 3 | - 1 | 3 | |
| CO5 | 3 | - | 2 | 3 | 3 | 3 | |

