20CE4601A - ADVANCED STRUCTURAL ANALYSIS

| Offe | ring B | ranch | es | CE | | | | | | | | | | | | | | | | | |
|-------------------|--|--|--|--|---|--|---|--|--|---|--|--------------------------------|--------------------------|-------|--|--|--|--|--|--|--|
| Course Category: | | | | Professional Elective | | | | | | | Credits: | | | 3 | | | | | | | |
| Course Type | | | | Theory | | | | | | | Lecture-Tutorial- | | | 3-0-0 | | | | | | | |
| course rype. | | | | Theory | | | | | | | Practical: | | | 5-0-0 | | | | | | | |
| | | | | | | | | | | | Continuous Evaluation: | | | 30 | | | | | | | |
| Prerequisites: | | | | 20CE3503-Structural Analysis Evaluation: | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | Evaluation: | | | 70 | | | | | | | |
| | | | | | | | | | | Total Marks: | | | 100 | | | | | | | | |
| Cours | e Outo | comes | | | | | | | | 1 | | | | | | | | | | | |
| Upon : | success | sful co | mpleti | on of t | he cou | rse, th | e stude | ent will | be ab | le to: | | | | | | | | | | | |
| CO1 | Anal | Analyze the three hinged and two hinged arches for concentrated and uniformly | | | | | | | | | | | | | | | | | | | |
| 001 | distri | distributed loads | | | | | | | | | | | | | | | | | | | |
| CO2 | Anai Kani | yze in 's meth | e stati | carry | Indeter | minate | e fram | es usn | ng Mo | ment di | Istributic | n metn | od and | K | | | | | | | |
| | Deve | lon In | fluenc | e line | diagra | ams fo | or all s | stress | resulta | nts in c | letermin | ate beau | ns and | | | | | | | | |
| CO3 | evalu | ate ab | solute | SF,BN | 1 in the | e beam | s for n | noving | loads. | | | | iio uiiu | K | | | | | | | |
| CO4 | Anal | yze ca | bles ar | nd susp | ensior | n bridg | es | | | | | | | K | | | | | | | |
| CO5 | Anal | yze the | e fixed | and c | ontinuo | ous bea | ams us | ing pla | astic an | alysis. | | | | K | | | | | | | |
| | Cor | tribut | ion of | Cour | se Out | comes | towa | rds acl | hieven | nent of] | Progran | n Outco | mes | | | | | | | | |
| CO1 | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSC | | | | | | | |
| $\frac{cor}{cor}$ | 2 | 2 | | | 2 | 3 | | | | | | | 2 | 3 | | | | | | | |
| $\frac{CO2}{CO3}$ | 3 | 3 | | | 3 | 3 | | | | | | | 3 | 3 | | | | | | | |
| CO4 | 2 | 2 | | | 2 | 3 | | | | | | | 2 | 3 | | | | | | | |
| CO5 | 2 | 2 | | | 2 | 3 | | | | | | | 2 | 3 | | | | | | | |
| Avg. | 2 | 2 | | | 2 | 3 | | | | | | | 2 | 3 | | | | | | | |
| | 1- | Low | | | | | 2-Me | dium | | | | 3-Hi | gh | | | | | | | | |
| | | | | | | Cou | rse (| Cont | tent | | | | | | | | | | | | |
| | Α | Arches | | | | | | | | | | | | | | | | | | | |
| | T | | | | | | | | | | | | | | | | | | | | |
| | 1 | nree n | ingea | Arcn: | | | | | | | | | | | | | | | | | |
| | In | troduc | tion, A | Analysi | is of th | nree hi | nged a | irch, B | .M, S. | F and n | ormal th | rust in | three- | | | | | | | | |
| UNIT | hi | nged a | arches, | three | hinge | d para | bolic a | arch su | ubjecte | d to co | ncentrat | ed load | s and | | | | | | | | |
| | -1 ur | uniformly distributed loads | | | | | | | | | | | | | | | | | | | |
| | Т | Two hinged Arch | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | |
| | In | Introduction, Analysis of two hinged arch, B.M, S.F and normal thrust in two- | | | | | | | | | | | | | | | | | | | |
| | nı | hinged arches, two hinged parabolic arch subjected to concentrated loads and | | | | | | | | | | | | | | | | | | | |
| | 111 | Analysis of statically indeterminate frames | | | | | | | | | | | | | | | | | | | |
| | ur A | nalvsis | s of sta | Moment distribution method: Analysis of single-storey single hav portal frames | | | | | | | | | | | | | | | | | |
| | ur Ai M | nalysis | s of sta t distri | ibutio | n meth | 10d: A | man you | under gravity and lateral loads. | | | | | | | | | | | | | |
| UNIT | ur Ai M -2 un | nalysis oment der gra | s of sta t distri avity a | ibutio nd late | n meth ral loa | 10d : A ds. | narysn | | | • | 0 5 | r | | CO | | | | | | | |
| UNIT | -2 un | nalysis oment der gra ani's 1 | s of sta t distri avity a netho | ibutio nd late d : Ana | n metł zral loa dysis c | 10d: A ds. of sing | le-stor | ev, sin | gle bay | y portal | frames | under g | ravity | CO | | | | | | | |
| UNIT | -2 un K | nalysis oment der gra ani's 1 id later | s of sta t distri avity a netho al load | ibutio nd late d: Ana 1 | n meth eral loa dysis c | iod: A ds. of sing | le-store | ey, sin | gle bay | y portal | frames | under g | ravity | CO | | | | | | | |
| UNIT | -2 un K an In | nalysis oment der gra ani's 1 d later fluenc | s of sta t distri avity a netho al load ce Line | ibutio nd late d: Ana l es and | n meth ral loa llysis c Movin | nod: A ds. of sing ng Loa | le-store | ey, sin | gle bay | y portal | frames | under g | ravity | CO | | | | | | | |
| UNIT | -2 un K an In In | nalysis oment der gra ani's 1 d later fluenc fluenc | s of sta t distri- avity a nethoo al load ce Lino ce Lino | ibution nd late d: Ana 1 es and es: De | n metheral loa dysis c Movin finition | nod: A ds. of sing ng Loa n of in | le-store ads | ey, sin | gle bay | y portal | frames nce line | under g | ravity | CO | | | | | | | |
| UNIT | -2 un K an -3 pc | nalysis foment der gra ani's 1 d later fluenc fluenc sition | s of sta t distri- avity a nethoo al load ce Line for ma | ibution nd late d: Ana l es and es: De aximur | n meth eral loa dysis c Movin finition n SF at | nod: A ds. of sing ng Loa n of in t a sect | le-store Ids fluenc tion-Lo | e line | gle bay | y portal , Influe for maxi | frames fr | for BM | -load ection | CO2 | | | | | | | |
| UNIT | -2 un K an -3 po sin di | nalysis foment der gra ani's 1 d later fluenc fluenc sition ngle p | s of sta t distri- avity a nethoo al load ce Lind for ma oint load ed load | ibution nd late d: Ana l es and es: De aximur oad, u | n mether al loa dysis c Movin finition n SF at niform | nod: A ds. of sing ng Loa n of in t a sect ily dis | le-store ads fluenc tribute | ey, sin e line bad pos d load | gle bay for SF sition f l longe | y portal , Influe for maxi er than | frames nce line mum BN the spa | for BM for at a seen, unife | -load ection ormly | CO2 | | | | | | | |

| | Movi maxin span, them | ing Loads : Introduction, maximum SF and BM at a given section and absolute imum S.F. and B.M due to single concentrated load U.D load longer than the , U.D load shorter than the span, two point loads with fixed distance between and several point loads. | | | | | | |
|---------------------|--|---|--|--|--|--|--|--|
| | Cables and Suspension Bridges | | | | | | | |
| UNIT-4 | Introd distril due to mome B.M a hinge | Introduction, Analysis of Cables Under Concentrated Loads and Uniformly distributed Loads, Shape of Cable under Self-Weight, Stresses in suspended Wires due to Self-Weight, Anchorage of Suspension Cables, Stiffened Bridges, Bending moment and shear force for Three Hinged Stiffened Girders, Influence Lines for B.M and S.F in Three-Hinged Stiffening Girders, Suspension Bridges with Two-hinged Stiffening Girders. | | | | | | |
| | Plastic Analysis | | | | | | | |
| UNIT-5 | Introduction, Shape factor, Plastic Hinge, Collapse Mechanisms, Static and Kinetic Theorems, Methods of analysis, Application to Fixed and Continuous Beams. | | | | | | | |
| | | Learning Resources | | | | | | |
| Text Books | | Pandit.G, Gupta.S and Gupta.R, Theory of Structures Vol.I & II, McGraw Hill Education, 2017. V.N Vazirani and M.M Ratwani, Analysis of Structures Vol-II, Khanna Publishers, 2012 | | | | | | |
| Reference | | C.K.Wang, Statically Indeterminate Structures, TataMcGrawHill, 2010. B.C. Hibbeler, Structural Analysis, 6/e, Pearson, 2011. | | | | | | |
| e- Resou | rces | | | | | | | |
| & oth | er | 1. <u>https://nptel.ac.in/courses/105101085/25-31</u> | | | | | | |
| digital material | | <u>https://onimecourses.npter.ac.in/hoc1/_ce2s/preview</u> <u>https://www.edx.org/learn/structural-engineering</u> | | | | | | |

Page **149** of **278**