CHAITANYA BHARATHI INSTITUTE OF TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

FEEDBACK ON CURRICULUM -2019-20

ANALYSIS AND ACTION TAKEN REPORT

Structured feedbacks on curriculum are obtained from stakeholders. The suggestions are analyzed and corrective measures suggested by stakeholders are considered.

Sr. No.	Suggestions/Comments	Actions taken
1	As the subject Maintenance of buildings covered topics in a small aspect, it can be replaced with SHM.	Health Monitoring and Retrofitting of Structures was introduced on the recommendations of BoS So that students will gain the knowledge in SHM.
2	The need for introducing climate change was raised in Disaster Management & Mitigation.	The latest events such as Climate change have been included in the Unit IV along with disaster impacts, demographic factors of disasters and trends of disasters.
3	Noise pollution is on the increasing trend and needs to be addressed.	The suggestion was put forth in BoS meeting and it was accepted to introduce a unit on Noise pollution in Environmental Engineering.
4	Outdated topics in surveying like chain, compass are to be minimised & new topics to be included.	Surveying course has been renamed as Surveying & Geomatics in which new topics related to modern field survey instruments and visual image interpretation with latest advancements and improve their knowledge.

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16CE E16

HEALTH MONITORING AND RETROFITTING OF STRUCTURES (ELECTIVE – VIII)

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course objectives: To enable the students to

1. Understand SHM as a way of monitoring health of a structure using smart materials
2. Learn and apply the various vibration based techniques for monitoring the health of the structure
3. Learn and apply the various capacitive sensing techniques for structures
4. Comprehend the methods of condition assessment of damages in buildings and to learn the different non- destructive evaluation and testing methods
5. Learn about implementation of health monitoring in different types of structures

Course Outcomes: At the end of the course the graduate should be able to

1. Interpret SHM as a way of monitoring the health of a structure using smart materials
2. Select and implement an appropriate vibration based technique for health monitoring of a structure
3. Select and implement an appropriate capacitive sensing technique
4. Perform condition assessment survey of damaged/ existing buildings and to identify possible defects in a concrete structure and suggest necessary repairs
5. Implement various health monitoring techniques for different types of structures for different situations

UNIT – I:

Introduction of Structural Health Monitoring (SHM) : Introduction, definition of structural health monitoring (SHM), basic components of SHM, Passive and Active SHM, Relationship between SHM – NDE(Non- Destructive Evaluation) and NDECS (Non- Destructive Evaluation of Co-operative Structures), materials for sensor design.

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UNIT – II:

Vibration based techniques used for structural health monitoring: SHM using vibration based technique – Introduction – Local and global methods – Applications. SHM using fiber optic sensors – Applications, SHM using Low Frequency Electromagnetic Techniques – Introduction – Applications to the NDE /NDT domain & SHM domain.

UNIT – III:

Capacitive Method: Introduction of capacitive methods, the principle, types of capacitive sensing, capacitive probe for cover concrete – Capacitive sensing in bridges (case studies), Applications for external post – tensioned cables.

UNIT – IV:

Conditions Survey, NDE and NDT of Concrete Structures: Definition and objective of condition survey, stages of conditions survey – planning, inspections and testing stages, possible defects in concrete structures, quality control of concrete structures, NDT techniques- rebound hammer, infra-red thermography, ground penetration technique, ultra-sonic pulse velocity test and Windsor probe test, calibration of NDT equipment and safety audit, semi destructive testing – core cutting.

UNIT – V:

Case studies on structures: Historical buildings, Special structures – bridges, dams, tunnels, high rise buildings.

Text Books:

1. Daniel Balageas and Claus–Peter Fritzen, "*Structural Health Monitoring*", published by ISTE Ltd., U.K .2006.
2. V.M. Malhotra, "*In Situ/Non-destructive Testing of Concrete (Publication, Sp-82)*", published by Amer Concrete Inst 1984.

Suggested Reading:

1. Hua- Peng Chen, "*Structural Health monitoring of large engineering structures*", published by Wiley-Blackwell, 2018.
2. "*Guide book on Non-destructive testing of concrete structures*", training course, series no.17, International Atomic Agency, Vienna 2002.
3. Jean-Paul Balayssac and Vincent Garnier, "*Non Destructive evaluation and evaluation of civil engineering structures*", published by ISTE Press – Elsevier, 2017.

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CBIT (A) With Effect from the Academic Year 2019-2020

16CE 002

DISASTER MITIGATION AND MANAGEMENT (Open Elective – I)

Instruction	3 Hours per week
Duration of Semester End Examination	3 Hours
SEE	70 Marks
CIE	30 Marks
Credits	3

Objectives:

1. To equip the students with the basic knowledge of hazards, disasters, risks and vulnerabilities including natural, climatic and human induced factors and associated impacts
2. To impart knowledge in students about the nature, causes, consequences and mitigation measures of the various natural disasters
3. To enable the students to understand risks, vulnerabilities and human errors associated with human induced disasters
4. To enable the students to understand and assimilate the impacts of any disaster on the affected area depending on its position/ location, environmental conditions, demographic, etc.
5. To equip the students with the knowledge of the chronological phases ina disaster management cycle and to create awareness about the disaster management framework and legislations in the context of national and global conventions

Outcomes: At the end of the course the students are able to

1. Analyze and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels
2. Understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan
3. Understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management
4. Understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same
5. Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand various

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participatory approaches/strategies and their application in disaster management

UNIT-I:

Introduction: Basic definitions- Hazard, Disaster, Vulnerability, Risk, Resilience, Mitigation, Management; classification of types of disaster- Natural and man-made; International Decade for natural disaster reduction (IDNDR); International strategy for disaster reduction (ISDR), National disaster management authority (NDMA).

UNIT-II:

Natural Disasters: Hydro meteorological disasters: Causes, Early warning systems- monitoring and management, structural and non-structural measures for floods, drought and Tropical cyclones; Geographical based disasters: Tsunami generation, causes, zoning, Early warning systems- monitoring and management, structural and non-structural mitigation measures for earthquakes, tsunami, landslides, avalanches and forest fires. Case studies related to various hydro meteorological and geographical based disasters.

UNIT-III:

Human induced hazards: Chemical disaster- Causes, impacts and mitigation measures for chemical accidents, Risks and control measures in a chemical industry, chemical disaster management; Case studies related to various chemical industrial hazards eg: Bhopal gas tragedy; Management of chemical terrorism disasters and biological disasters; Radiological Emergencies and case studies; Case studies related to major power break downs, fire accidents, traffic accidents, oil spills and stampedes, disasters due to double cellar construction in multi-storeyed buildings.

UNIT-IV:

Disaster Impacts: Disaster impacts- environmental, physical, social, ecological, economical, political, etc.; health, psycho-social issues; demographic aspects-gender, age, special needs; hazard locations; global and national disaster trends; climate change and urban disasters.

UNIT-V:

Concept of Disaster Management: Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; risk analysis, vulnerability and capacity assessment; Post-disaster environmental response-water, sanitation, food safety, waste management, disease control; Roles and responsibilities of government, community, local institutions, NGOs and other stakeholders; Policies and legislation for disaster risk reduction, DRR

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18CE C20

ENVIRONMENTAL ENGINEERING

Instruction	3L Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	3

Course Objectives: To enable the student

1. Understand methods of population forecasting, estimate water quantity to be supplied in towns and design water distribution network.
2. Understand and design various units of a water treatment plant.
3. Calculate sewage produced in residential areas and design conveyance components.
4. Learn about design components of waste water treatment plants, low cost treatment techniques and sludge digestion systems.
5. Address issues of air pollution and noise pollution with the aid of appropriate control methods.

Course Outcomes: At the end of the course, the student will be able to

1. identify an appropriate population forecasting method and estimate quantity of water to be supplied and plan & design conveyance components.
2. design water treatment units for a water treatment plant.
3. estimate quantity of sewage and storm water & characteristics of sewage, design sewers and plan sewer appurtenances.
4. design components of waste water treatment plant and sludge digestion systems.
5. understand and judge methods for control of particulate matter and gaseous pollutants in the atmosphere, outline noise pollution control methods.

UNIT – I:

Introduction: Protected water supply, population forecasting methods, design period, types of water demand, factors affecting, fluctuations, fire demand, drinking water standards; sources of water, comparison from quality and quantity and other considerations; intakes, infiltration galleries; Design of distribution systems, pipe appurtenances.

UNIT – II:

Water treatment: Sedimentation principles, design factors, coagulation, flocculation, clarifier design, coagulants, feeding arrangements. Filtration theory, working of slow and rapid gravity filters, multimedia filters, design of filters, troubles in operation, comparison of filters, disinfection, theory of chlorination, chlorine demand, other disinfection practices.

UNIT - III:

Characteristics of sewage: Waste water collection, estimation of waste water and storm water, decomposition of sewage, self purification of rivers, examination of sewage, B.O.D. Equation, C.O.D. Design of sewers, shapes and materials, sewer appurtenances, house drainage, plumbing requirements, sanitary fittings, traps, one pipe and two pipe systems of plumbing.

UNIT – IV:

Waste water treatment: Primary treatment: screens, grit chambers, skimming tanks, sedimentation tanks, principles of design, Biological treatment: Design of trickling filters, Activated Sludge Treatment and oxidation ponds. Sludge digestion: factors affecting, design of digestion tank, septic tanks: working principles and design, soak pits, ultimate disposal of sewage.

UNIT – V:

Air pollution: Meteorological parameters affecting air pollution, atmospheric stability, plume behaviour, control of particulates, gravity settlers, cyclone filters, Electrostatic precipitators; Control of gaseous pollutants.
Noise – Basic concept, measurement and various control methods.

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18CE C04

SURVEYING AND GEOMATICS

Instruction	4(3L+1T) Hours per week
Duration of Semester End Examination	3 Hours
Semester End Examination	70 Marks
CIE	30 Marks
Credits	4

Course Objectives: To enable the student to

1. Understand the basics of Surveying
2. Know and read the topo sheets.
3. Use the topo sheets for taking appropriate decisions.
4. Expose to various Surveying instruments.
5. Develop the maps required for various applications accurately.

Course Outcomes: At the end of the course the student is able to

1. Know the estimation of various parameters required for execution of a project.
2. Be in a position to choose appropriate instruments for carrying Surveying.
3. Can identify the data required for preparation of topo sheets.
4. Acquiring the data accurately and quickly with proper checks.
5. Knows the way of transferring data from topo sheets to ground and vice versa.

UNIT-I:

Introduction to Surveying :Principles and objectives of surveying, Linear, angular and graphical methods, concept of Survey stations, Survey lines- ranging, brief introduction to offsets-types and uses; Bearing of survey lines using prismatic compass, concepts of whole circle bearing system and quadrantal bearing system.
Levelling: principles, terms used in levelling, bench marks and types, booking and reduction of levels, types of levelling; contouring: Contours- definition, contour interval, characteristics, methods of contouring and interpolation and uses of contours, estimation of areas and volumes using Trapezoidal and Simpson's method.
Plane table surveying: concepts, methods of plane table surveying.
Triangulation and Trilateration: Theodolite survey: Instruments, Measurement of horizontal and vertical angle; Trigonometric levelling - Axis signal correction.

UNIT-II:

Curves: Elements of simple and compound curves – Method of setting out, Elements of Reverse curve, Transition curve – length of curve – Elements of

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transition curve, Vertical curves-types, setting out of vertical curves-tangent correction method and chord gradient method.

UNIT-III:

Modern Field Survey Systems: Principle of Electronic Distance Measurement, Modulation, Types of EDM instruments, Diatomite, Total station-Parts of a Total Station – Accessories, Advantages and Applications, Field Procedure for total station survey, Errors in Total Station Survey-concepts of consecutive coordinates- Total coordinates-balancing of traverse-Plotting of traverse.

Global Positioning: Systems- Segments, GPS measurements, errors and biases, surveying with GPS, Co-ordinate transformation, accuracy considerations.

UNIT-IV:

Photogrammetric Surveying: Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial Photogrammetric, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo plotting instruments, mosaics, map substitutes.

UNIT-V:

Remote Sensing: Introduction –Electromagnetic Spectrum, interaction of electromagnetic radiation with the atmosphere and earth surface, remote sensing data acquisition: platforms and sensors.

Visual image interpretation: introduction, fundamentals of visual image elements, image interpretation strategies and keys, wavelength of sensing, temporal aspects of image interpretation. Introduction to types of digital image processing.

Text Books:

1. Subramanian,"
2. *Surveying and Levelling*", Oxford Higher Education, 2012.
3. K. R. Arora, "*Surveying, Vol-I, II and III*", Standard Book House, 2015.
4. GopiSatheesh and R.Sathikumar, "*Advanced Surveying: Total Station, GIS and Remote Sensing*", Pearson India, 2006.

Suggested Reading:

1. K. Manoj K. Arora and R. C. Badjatia," *Geomatics Engineering*", Nem Chand & Bros, 2011
2. A. M. Chandra, "*Higher Surveying*", Third Edition, New Age International (P) Limited, 2002.
3. M. Anji Reddy, "*Remote sensing and Geographical information system*", B.S. Publications, 2001.

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