# STATE BOARD OF TECHNICAL EDUCATION, BIHAR

**Scheme of Teaching and Examinations for**

**3rd SEMESTER DIPLOMA IN FIRE TECHNOLOGY AND SAFETY**

(Effective from Session 2022-23 Batch)

## THEORY

| Sr. No. | SUBJECTS | SUBJECT CODE | TEACHING SCHEME | EXAMINATION – SCHEME | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Periods per Week | Hours of Exam. | Teacher's Assessment (TA) Marks(A) | Class Test (CT) Marks (B) | End Semester Exam. (ESE) Marks(C) | Total Marks (A+B+C) | Pass Marks ESE | Pass Marks in the Subject | Credits |
| 1. | Fire Codes & Standards | 2048301 | 04 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 2. | Engineering Materials | 2048302 | 04 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 3. | Thermal Engineering | 2048303 | 03 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 4. | Fundamental of Electrical & Mechanical Measurements | 2048304 | 04 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| 5. | Explosions and Industrial Fire Safety | 2048305 | 04 | 03 | 10 | 20 | 70 | 100 | 28 | 40 | 03 |
| | | **Total: -** | **19** | | | | **350** | **500** | | | **15** |

## PRACTICAL

| Sr. No. | SUBJECT | SUBJECT CODE | TEACHING SCHEME | EXAMINATION-SCHEME | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Periods per Week | Hours of Exam. | Practical (ESE) | | Total Marks (PA+ESE) | Pass Marks in the Subject | Credits |
| | | | | | Internal (PA) | External (ESE) | | | |
| 6. | First Aid | 2048306 | 04<br>50% physical<br>50% Virtual | 03 | 15 | 35 | 50 | 20 | 02 |
| 7. | Fire Protection Lab | 2048307 | 04<br>50% physical<br>50% Virtual | 03 | 15 | 35 | 50 | 20 | 02 |
| 8. | Fire Fighting Training-I | 2048308 | 04<br>50%physical<br>50% Virtual | 03 | 15 | 35 | 50 | 20 | 02 |
| **Total: -** | | | **12** | | | | **150** | | **06** |

## TERM WORK

| Sr. No. | SUBJECT | SUBJECT CODE | TEACHING SCHEME | EXAMINATION-SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Periods per Week | Marks of Internal Examiner (PA) | Marks of External Examiner (ESE) | Total Marks (PA+ESE) | Pass Marks in the Subject | Credits |
| 9. | Summer Internship-I | 2048309 | (4 Weeks) | 23 | 52 | 75 | 30 | 02 |
| 10. | Python | 2018311 | 02 | 07 | 18 | 25 | 10 | 01 |
| **Total: 02** | | | | | | **100** | | **03** |
| **Total Periods per week Each of duration One Hour 33** | | | | Total Marks = **750** | | | | **24** |

# FIRE CODES & STANDARDS

| Subject Code 2048301 | Theory | | | No of Period in one session : 56 | | | Credits |
|---|---|---|---|---|---|---|---|
| | No. of Periods Per Week | | | Full Marks | : | 100 | 03 |
| | L | T | P/S | ESE | : | 70 | |
| | 04 | — | — | TA | : | 10 | |
| | | | | CT | : | 20 | |

## Rationale:

Fire code & standards is a subject which deals BIS has formulated more than 150 standards on fire safety in buildings and firefighting equipment & systems and important ones are: Code of practice for fire safety of building (IS 1641 to IS 1646), electrical generating and distributing stations (IS 3034), cotton textile mills (IS 3079), rubber and plastic (IS 11457 Part 1).

## Course Outcomes :

After completion of this course student will be able to:-

1. Classify fire and fire properties
2. Understand technical parameter of appliance to control fire
3. Remember different codes of fire
4. To prepare list of code and standards for construction & design of building.

| Contents : Theory | | Hrs |
|---|---|---|
| **Unit -1** | Classification of fire, Portable fire extinguishers, Pumps and primers, Foam and foam making equipments. | [06] |
| **Unit -2** | Technical parameter / specification specific reference to appliances. | [06] |
| **Unit -3** | Code & Standards concerning construction & Design of building. | [06] |
| **Unit -4** | International code & standard for Hydraulic platform, Turntable ladder and other Rescue and fire-fightingdevices and components. | [08] |
| **Unit -5** | Code and Standard for passive fire protection system and materials. | [06] |
| **Unit -6** | Code, Standard and specification concerning to safety of fire-fighting personnel i.e., BreathingApparatus P.P.E., safety gears and other devices. | [08] |
| **Unit -7** | Code, Standard and byelaws concerning Industrial, Municipal and State life safety & fire protectionmeasures. | [08] |
| **Unit -8** | Code and Practice for construction of temporary structures, pandal/ Samiyana and scaffolding. | [08] |
| | **Total** | **56** |

**Books Recommended:-**


1. NBC, B.I.S, DIN, EU, B.S., UL, FM Code & Standards, EN. Standards C.E. Australian codes.
2. DGMS, Director general of mines. Safety and mines regulations.
3. All relevant standards specification, codes and practice National & International Standard.

# ENGINEERING MATERIAL

| Subject Code 2048302 | Theory | | | No. of Period in one session : 56 | | | Credits |
|---|---|---|---|---|---|---|---|
| | No. of Periods Per Week | | | Full Marks | : | 100 | 03 |
| | L | T | P/S | ESE | : | 70 | |
| | 04 | — | — | TA | : | 10 | |
| | | | | CT | : | 20 | |

## Rationale:

Engineering materials refers to the group of materials that are used in the construction of manmade structures and components.
The primary function of an engineering material is to withstand applied loading without breaking and without exhibiting excessive deflection.

## Course Outcomes :

1. After completion of the course, the students will be able to classify different engineering materials.
2. Understand the applications conducting and resistive materials.
3. Use properties of engineering materials.
4. Select materials for different engineering applications.
5. Draw equilibrium diagram, Iron carbide phase diagram etc.

| Contents : Theory | | Hrs |
|---|---|---|
| **Unit -1** | **Structure of solids :-**<br>Classification of engineering materials, Structure-property relationship in engineering materials, Crystalline and non crystalline materials, Miller Indices, Crystal planes and directions, Determination of crystal structure using X-rays, Inorganic solids, Silicate structures and their applications. Defects; Point, line and surface defects. | [10] |
| **Unit -2** | **Mechanical properties of materials**<br>Elastic, An elastic and Visco elastic behavior, Engineering stress and engineering strain relationship, True stress<br>- true strain relationship, review of mechanical properties, Plastic deformation by twinning and slip, Movement of dislocations, Critical shear stress, Strengthening mechanism, and Creep. | [10] |
| **Unit -3** | **Equilibrium diagram:**<br>Solids solutions and alloys, Gibbs phase rule, Unary and binary eutectic phase diagram, Examples and applications of phase diagrams like Iron - Iron carbide phase diagram. | [08] |
| **Unit -4** | **Electrical and magnetic materials:**<br>Conducting and resistor materials, and their engineering application; Semiconducting materials, their properties and applications; Magnetic materials, Soft and hard magnetic materials and applications; Superconductors; Dielectric materials, their properties and applications. Smart materials: Sensors and actuators, piezoelectric, magneto astrictive and electro astrictive materials. | [10] |
| **Unit -5** | **Corrosion process**:<br>Corrosion, Cause of corrosion, Types of corrosion, Protection against corrosion. | [08] |
| **Unit -6** | **Materials selection:**<br>Overview of properties of engineering materials, Selection of materials for different engineering applications. | [10] |
| | **Total** | **56** |

**Books Recommended:-**

**Text Books:**


1. W.D. Callister, Materials Science and Engineering; John Wiley & Sons, Singapore, 2002.
2. W.F. Smith, Principles of Materials Science and Engineering: An Introduction; Tata Mc-Graw Hill, 2008.
3. V. Raghavan, Introduction to Materials Science and Engineering; PHI, Delhi, 2005.


**Reference Books:**


1. S. O. Kasap, Principles of Electronic Engineering Materials; Tata Mc-Graw Hill, 2007.
2. L. H. Van Vlack, Elements of Material Science and Engineering; Thomas Press, India, 1998.
3. K. G. Budinski, Engineering Materials – Properties and selection, Prentince Hall India, 1996

# THERMAL ENGINEERING

| Subject Code | Theory | | | No of Period in one session : 42 | | | Credits |
|---|---|---|---|---|---|---|---|
| | No. of Periods Per Week | | | Full Marks | : | 100 | |
| | L | T | P/S | ESE | : | 70 | 03 |
| 2048303 | 03 | — | — | TA | : | 10 | |
| | | | | CT | : | 20 | |

## Rationale:

Thermal engineering focuses on the transfer of heat, fluid mechanics, and heating and cooling systems, such as those used in the electric power industry, the automobile industry and the heating, ventilation and air conditioning (HVAC) industry.

## Course Outcomes:

At the end of the course the student will be able to:

1. Understand laws of thermodynamic
2. Apply Properties of Fluid Flow
3. Correlate Thermodynamic relation during fire
4. Classify different types air compressors
5. Use the process of enthalpy, specific heats and entropy of gas mixtures

.

| Contents : Theory | | Hrs |
|---|---|---|
| **Unit -1** | **Laws of Thermodynamics:-**<br>Zero law of thermodynamics, First law of Thermodynamics and its applications, second law of thermodynamics, , Clausius' statement,<br>Kelvin planck, statement, Concept of entropy, property of Entropy, Clausius' inequality, entropy change in various processes, Entropy Principle and its application, | [06] |
| **Unit -2** | **Properties of Gases and Gas Mixture:**<br>Avogadro's law, Equations of State, Virial Expressions, Law of corresponding states, Properties of Mixtures of Gases, Internal Energy, enthalpy, specific heats and entropy of Gas mixtures. | [06] |
| **Unit -3** | **Vapor and Vapor Power Cycles:**<br>Properties and processes of ideal vapor, Qualities of steam, Simple steam power cycle, Rankine Cycle, Actual Vapor Cycle, Actual Vapor Cycle Processes, Reheat cycle, ideal and Practical Regenerative Cycles, Characteristics of an ideal Working Fluid in Vapor Power Cycles, Binary Vapor Cycles. | [10] |
| **Unit -4** | **Reciprocating Gas Compressor** :<br>Classification of air compressors, Advantages and Disadvantages of Air compressors, Compression Processes, Working of Reciprocating Compression, Analysis of Single Stage Reciprocating Air Compressor, Analysis of Multi-Stage Compressors | [10] |
| **Unit -5** | **Thermodynamics of Fluid Flow:**<br>Velocity of pressure pulse in a fluid, Stagnation Properties, One dimensional Steady Isentropic Flow, Choking in Isentropic Flow, Critical Properties, normal Shocks, Adiabatic Flow with Friction and Diabatic Flow without Friction. | [10] |
| | **Total** | **42** |

**Text Books:**


1. P.K. Nag, Engineering Thermodynamics, TMH Publishers
2. J. SelwinRajadurai, Thermodynamics & Thermal Engineering, New Age International Publishers


**Reference Books:**


1. C.P. Arora, Thermodynamics, TMHPub.
2. D.S. Kumar, Thermal Science & Engineering, S.K. Kataria &Sons
3. S.C. Gupta, Thermodynamics, Pearson Education
4. Cengal & Boles, Thermodynamics- An Engineering Approach, McGrawHill
5. K. Ramakrishna, Engineering Thermodynamics, Anuradha Agencies

# FUNDAMENTAL OF ELECTRICAL & MECHANICAL MEASUREMENTS

| Subject Code 2048304 | Theory | | | No of Period in one session : 56 | | | Credits |
|---|---|---|---|---|---|---|---|
| | No. of Periods Per Week | | | Full Marks | : | 100 | 03 |
| | L | T | P/S | ESE | : | 70 | |
| | 04 | — | — | TA | : | 10 | |
| | | | | CT | : | 20 | |

## Rationale:

The action of measuring anything, or a certain number of objects, is a measurement. Also measuring certain things correctly is very necessary including distance, time, and accuracy. We can really know the universe around us by measuring such occurrences or, in other words, by taking such measurements.

## Course Outcomes:

At the end of the course, student will be able to

1. Identify the various parameters that are measurable in electronic instrumentation.
2. Employ appropriate instruments to measure given sets of parameters.
3. Practice the construction of testing and measuring set up for electronic systems.
4. Understand instrumentation concepts which can be applied to Control systems.
5. Use relevant measuring instrument in different electrical applications.

| | Contents : Theory | Hrs |
|---|---|---|
| **Unit -1** | **Fundamentals of Measurements**<br>1.1 Measurement: Significance, units, fundamental quantities and standards Classification of Instrument Systems: Terms applicable to measuring instruments: Precision and Accuracy, Sensitivity and Repeatability, Range, calibration; Null and deflection type instruments Static and dynamic characteristics, types of errors Classification of measuring instruments: indicating, recording<br>1.2 Measuring instruments: Introduction; Absolute and secondary instruments; Analog and digital instruments; Thread measurements: Thread gauge micrometre; Angle measurements: Bevel protractor, Sine Bar; Gauges: plain plug gauge, ring Gauge, snap gauge, limit gauge; Comparators: Characteristics of comparators, Types of comparators. 1.2 Surface finish: Definition, Terminology of surface finish, | [12] |
| **Unit -2** | **Measurement of voltage and current**<br>DC Ammeter: Basic, Multi range, Universal shunt,<br>DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity. AC voltmeter: Rectifier type (half wave and full wave)<br>CT and PT: construction, working and applications.<br>Clamp-on meter. | [12] |
| **Unit -3** | **Circuit Parameter Measurement, CRO and Other Meters**<br>Measurement of resistance:<br>Low resistance: Kelvin's double bridge, Medium Resistance: Voltmeter and ammeter method | [10] |
| **Unit -4** | **Transducers and Strain gauges**: Introduction of Transducers, Characteristics, classification of transducers, two coil self-inductance transducer, Piezoelectric transducer | [10] |
| **Unit-5** | **Applied mechanical measurements:** Speed measurement: Classification of tachometers, Revolution counters, Eddy current tachometers; Displacement measurement: Linear variable Differential transformers (LVDT); Flow measurement: Rotameters Temperature measurement: Resistance thermometers, Optical Pyrometer. 3.2 Miscellaneous measurements: Humidity measurement: hair hygrometer; Density measurement: hydrometer; Liquid level measurement | [12] |
| | **Total** | **56** |

**References:**

1. A Text Book of Electrical Technology Vol-I (Basic Electrical Engg.) by A.K., Theraja B. L,Theraja S.Chand and Co. New Delhi, ISBN:9788121924405

2. Basic Electrical Engineering Mittle by V.N. McGraw-Hill New Delhi, ISBN:978-0-07-0088572-5,

3. Edward Hughes, Electrical Technology, Pearson Education, New Delhi, ISBN-13: 978-0582405196

4. Electrical and Electronic Measurement and Instrumentation, R. K Rajput, S.Chand and Co. New Delhi, ISBN :9789385676017

5. Electrical and Electronics Measurement sand Instrumentation. By A.K. Sawhney Dhanpat Rai and Sons, New Delhi, ISBN :9780000279744

6. Electrical Measurements and Measuring Instruments by N.V. Suryanarayana S.Chand and Co. New Delhi, ISBN:8121920116

7. Electrical Measurements S.N. Bhargava FPH

8. Electrical Measurements Aashirvad Kumar FPH

9. Electrical and Electronic Measurements Deepak Kumar FPH

**Course outcomes:**

The theory, practical experiences and relevant soft skills associated with this course are to be taught and implemented, so that the student demonstrates the following industry-oriented Cos associated with the above-mentioned competency:

**a)** Check the working of the electrical measuring instrument.

**b)** Use different types of measuring instruments for measuring voltage and current.

**c)** Use different types of measuring instruments for measuring electric power

**d)** Use different types of measuring instruments for measuring electric energy.

**e)** Use different types of electrical instruments for measuring various ran

# EXPLOSION AND INDUSTRIAL FIRE SAFETY

| Subject Code 2048305 | Theory | | | No of Period in one session : 56 | | | Credits |
|---|---|---|---|---|---|---|---|
| | No. of Periods Per Week | | | Full Marks | : | 100 | 03 |
| | L | T | P/S | ESE | : | 70 | |
| | 04 | — | — | TA | : | 10 | |
| | | | | CT | : | 20 | |

## Rationale:-

Industrial fire safety is a necessary part of any industrial warehouse and manufacturing plant, though **fires and explosions vary** from causes and severity. As industrial fire protection standards improve each year, safety and health professionals want to ensure the best practices on how to prevent fires and explosions.

## Course Outcomes:-

At the end of the course student will able to

1. Prevent the occurrence of fire and explosion;
2. Reduce the risk to life caused by fire
3. Reduce the risk of damage caused by fire to the vessel, its cargo and the environment
4. Provide adequate and readily accessible means of escape for crew
5. Understand method of explosion prevention techniques in Industry

| Contents : Theory | | Hrs |
|---|---|---|
| **Unit -1** | **Introduction to Explosion Characteristics:** Background - Burchfield explosion case study. Other similar explosion incidents; Explosion hazards; Stoichiometry for gases- Introduction, Calculation for air, Calculation for O2; Stoichiometry for general hydrocarbons and wood (Air to fuel ratio); Application of stoichiometry- Naphtha storage tank example, Burner startup; Boiler firebox explosion. | [12] |
| **Unit -2** | **Flammability limits and Theories:** Lean limit and Rich limit, LEL & UEL measurement techniques and equipment, Minimum ignition energy, Relation between auto-ignition temperature and flash point, Effect of temperature and pressure on flash point, Classification of flammable materials, Vapour tank explosion, a. TWA flight 800 Disaster. | [12] |
| **Unit -3** | **Explosion Prevention and Protection:-** Explosion prevention techniques-a. Ventilation. Separation. Physical barriers. Alternative techniques, Preventing the formation of explosive atmosphere, Explosion protection systems - a. Protection techniques - Containment, Isolation, Suppression, Venting, b. Ventilation for explosion protection system, c. Explosion protection using inert gases, Flame arrestors and quenching distance. | [12] |
| **Unit -4** | **Safety Management:-** Concept Of Safety, Industrial Accidents, Reasons For Accident Prevention, Function Of Safety Management, Safety Organizations, Objectives Of Safety Organizations, Role Of Industrial Organization (Safety), Essential Requirements Of Safety Programs, Plant Safety Rules And Procedures, FormulationOf Rules, Types Of Rules, Violation Of Rules, Reduction Of Hazards. | [10] |
| **Unit -5** | **Safety In Miscellaneous Industries:-** Hazards And Safety Measures For Welding Process, Types Of Welding Processes, Precaution And Safety, Fertilizer Industry, Pesticides Industry, Lethal Dosages, Manipulation Process And Their Hazards And Controls, Textile Industry, Steel In Industry, Chemical Hazards. | [10] |
| **Total** | | **56** |

**Reference Books:**


1. Handbook of fire and Explosion Protection Engineering Principles for Oil, Gas, Chemical and Related Facilities- Dennis. P. Nolan
2. National Fire Protection Association Handbook
3. Hazards in Process Industries – Hidup Suatu Pendakian
4. Industrial Safety Management - N.K. Tara Fdar, K.J Tara Fdar
5. Industrial Safety - National Safety Council of India.

# FIRST AID

| Subject Code 2048306 | Practical | | | No. of Period in one Session : 56 | | Credit |
|---|---|---|---|---|---|---|
| | Number of Period Per Week | | | Full Marks | 50 | 2 |
| | L | T | P/S | Internal (PA) | 15 | |
| | | | 4 | External (ESE) | 35 | |

| | List of Experiment | Hrs |
|---|---|---|
| **1.** | Perform an experiment to practice for first aid treatment for fire affected people. | 06 |
| **2.** | Perform an experiment for artificial respiration for smoke affected people. | 06 |
| **3.** | Study of circulatory system, heat attack and chest compression in case of fire hazards. | 06 |
| **4.** | Study of first aid treatment for fracture and injuries. | 06 |
| **5.** | Prepare list of medicines and first aid materials to be kept in lab / industry for fire hazards purposes. | 08 |
| **6.** | Prepare list of medicines and first aid materials to be kept in Lab / Industry protection for fracture / smokes / dust. | 08 |
| **7.** | Write the process and perform an experiment for first aid treatment of unconscious persons due to Fire hazards for which first aid treatment required. | 08 |
| **8.** | Write the process and perform an experiment for eye injuries for which first aid treatment required. | 08 |

**Practical Outcomes:** After completion of this course, students will be able to

1. Understand the first aid treatment in case of fire hazards, fractures, and methods to be provided respiration.
2. Prepare list of first aid treatment materials & medicines.
3. Provide first aid treatment to victims.

**Reference Books:**

# FIRE PROTECTION LAB

| Subject Code 2048307 | Practical | | | No of Period in one session : 56 | | Credit |
|---|---|---|---|---|---|---|
| | Number of Period Per Week | | | Full Marks | 50 | 2 |
| | L | T | P/S | Internal (PA) | 15 | |
| | | | 4 | External (ESE) | 35 | |

| Content: Practical | | Hrs |
|---|---|---|
| **List of Experiment-1** | Study of elements of fire and their use | **04** |
| **List of Experiment -2** | Study and use of different fire extinguishing Hand Appliances - water, foam, dry powder, ABC Powder, CO2, Halon. | **04** |
| **List of Experiment -3** | Study of basic fire protection equipment's. | **04** |
| **List of Experiment -4** | Study of Modular Automatic Fire Extinguishers, Trolley Mounted fire extinguishers. | **04** |
| **List of Experiment -5** | Study of Fire Protection systems, Fire Alarm System, Manual, Electric, & Automatic Fire Detection System | **04** |
| **List of Experiment -6** | Study of Water sprays system. | **04** |
| **List of Experiment -7** | Study of Mobile fire-fighting Equipment Mobile Monitors, Trailor, Pumps, Fire. | **04** |
| **List of Experiment -8** | Visit of fire protection training centers | **28** |

**Practical Outcomes:** After completion of this course, students will be able to

1. Understand the elements of fire & their use.
2. Use different fire extinguishing hand appliances.
3. Prepare use list of fire protection equipments.
4. Use modular automatic fire extinguishers and trolley mounted fire extinguishers.

**Reference Books:**

# FIRE FIGHTING TRAINING-I

| Subject Code 2048308 | Practical | | | No of Period in one session : 56 | | Credit |
|---|---|---|---|---|---|---|
| | Number of Period Per Week | | | Full Marks | 50 | 2 |
| | L | T | P/S | Internal (PA) | 15 | |
| | | | 4 | External (ESE) | 35 | |

**Study and perform experiments to apply safe working practices**

1. Follow and maintain procedures to achieve a safe working environment in line with occupational health and safety regulations and requirements and according to policy.
2. Recognize and report all unsafe situations according to policy.
3. Identify and take necessary precautions on fire and safety hazards and report according to work policy and procedures.
4. Identify, handle and store / dispose-off dangerous goods and substances according to policy and procedures following safety regulations and requirements.
   Identify and observe policies and procedures in regard to illness or accident.

**Study & Perform to Comply environment regulation and housekeeping**

1. Identify environmental pollution & contribute to the avoidance of instances of environmental pollution.
2. Deploy environmental protection legislation & regulations.
3. Take opportunities to use energy and materials in an environmentally friendly manner.
4. Avoid waste and dispose waste as per procedure.
5. Recognize different components of 5S and apply the same in the working environment.

**Study to Interpret technical drawings and documents**

1. Obtain sources of information and recognize information.
2. Use and draw up technical drawings and documents.
3. Use documents and technical regulations and occupationally

**Study to develop to communication.**

1. Conduct appropriate and target oriented discussions with higher authority and within the team.
2. Present facts and circumstances, possible solutions &use English special terminology.
3. Resolve disputes within the team Conduct written communication.

**Practical Outcomes :**

After completion of this course, students will be able to

1. Hose Drills General movements to be noted for handling delivery hose, hydrant Drill (3- Men) Hydrant Drill (4-Men).

2. Perform Pump Drills Trailer Pump Drill (Four Men), Trailer Pump Drill (Six Men), Motor Fire Engine (without escape)/Water Tender Drill (Six Men), First Aid Hose reel Drill (Three Men).

3. Use Ladder Drills: Extension Ladder (Four Men), Hook Ladder Drill, Hook Ladder Drill (One Men), Hook Ladder Drill (Two Men), Hook Ladder Drill (Three Men), Fire escape Ladder Drill (Six Men), getting a Branch to work up on Escape Ladder, getting a Branch to work from an escape Ladder, Turn Table, Ladder Drill (Six Men), Hydraulic Platform. Drill (Six Men).

**Reference Books:**

# SUMMER INTERNSHIP-I

| Subject Code 2048309 | Term Work | | | No of Period in one session : 56 | | Credit |
|---|---|---|---|---|---|---|
| | Number of Period Per Week | | | Full Marks | 75 | 2 |
| | L | T | P/S | Internal (PA) | 23 | |
| | | | 4 | External (ESE) | 52 | |

## RATIONALE

Students' Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course covered in many subjects and Labs, by undertaking a project. The prime emphasis of the project work is to understand and apply the basic knowledge of the principles of Food Technology and practices in real life situations, so as to participate and manage a Food Tech. Project in future.

## COURSE OBJECTIVES :

**After undergoing the Project Work, the student will be able to:**

1. Implement the theoretical and practical knowledge and skills gained through various subjects/courses into an application suitable for a real practical working environment, preferably in an industrial environment.
2. Develop software packages or applications and implement these for the actual needs of the community/industry.
3. Identify and contrast gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
4. Carry out cooperative learning through synchronous guided discussions within the class in key areas, asynchronous document sharing and discussions, as well as prepare collaborative edition of the final project report.
5. To achieve real life experience in software/hardware design.
6. To develop the skill of writing Project Report General Guidelines The individual students have different aptitudes and strengths and also areas of interest. Project work, therefore, should match the strengths and interest of the students. For this purpose, students should be asked to identify the type of project work, they would like to execute. The activity of problem identification should begin well in advance (right from beginning of 5th semester). Students should be allotted a problem of interest to him/her as a project work. It is also essential that the faculty of the respective department may have a brainstorming session to identify suitable project assignments for their students. The project assignment can be individual assignment or a group assignment. Preferably there should not be more than 5 students, if the project work is given to a group. The project work identified in collaboration with industry should be preferred.

**Following are the broad suggestive areas of project work**

1. Selection of project assignment
2. Planning and execution of considerations
3. Quality of performance
4. Providing solution of the problems or production of final product
5. Sense of responsibility
6. Self expression/ communication/ Presentation skills
7. Interpersonal skills/human relations
8. Report writing skills

9 Viva voce

The teachers are free to evolve other criteria of assessment, depending upon the type of project work. It is proposed that the institute may organize an annual exhibition of the project work done by the students and invite leading Industrial organizations.

# PYTHON / OTHERS –TW

| Subject Code 2018311 | Term Work | | | No. of period in one session:28 | | Credit |
|---|---|---|---|---|---|---|
| | Number of Period Per Week | | | Full Marks | 25 | 1 |
| | L | T | P/S | Internal (PA) | 07 | |
| | | | 2 | External (ESE) | 18 | |

## COURSE OBJECTIVES:

1. To write different python programs for adding, multiplying matrices.
2. To understand python programs to Extract Unique values, dictionary values.
3. To demonstrate basic data type in python.

## COURSE OUTCOMES:

**After completion of this course, the students will be able to:**

1. To write different python programs for adding, multiplying matrices.
2. To understand python programs to extract Unique values, dictionary values.
3. To demonstrate basic data type in python.

| CONTENTS | | Hrs. |
|---|---|---|
| **1** | Write a program to demonstrate basic data type in python. | **[02]** |
| **2** | Write a program to compute distance between two point staking input from the user(Pythagorean Theorem) | **[02]** |
| **3** | Write a python program Using a for loop: write a program that prints out the decimal equivalent of 1+½+1/3….1/n | **[02]** |
| **4** | Write a Python program to find first n prime numbers.<br>Write a program to demonstrate list and tuple in python. | **[04]** |
| **5** | Write a program using a for loop that loops over a sequence.<br>Write a program using a while loop that asks the user for a number and prints a count down from that number to zero. | **[04]** |
| **6** | Write a Python Program to add matrices.<br>Write a Python program to multiply matrices. | **[04]** |
| **7** | Write a Python program to check that fast ring is palindro me or not. | **[02]** |
| **8** | Write a Python program to Extract Unique values, dictionary values | **[02]** |
| **9** | Write a Python program to read file word by word<br>Write a Python program to Get number of characters, words. | **[04]** |
| **10** | Write a Python program for Linear Search | **[02]** |

## Books Recommended :