

CAREER ORIENTED CERTIFICATE COURSE ON REFRIGERATION

Syllabus

Paper I : Concepts of Computers and Fundamentals of Refrigeration.

Part A : Basic Concepts of Computers(4 Credits)

Unit I : Analog and digital computers. Generations of Computers. Basic ideas of CPU, input and output devices, memory. Introduction of terms :ROM, RAM, PROM, EPROM, EEPROM, Floppy Drive, diskettes, hard disk. Hardware and software. Binary system, hex decimal system. Storage of information –EB CDIC, ASCII, BCD (2 Credits)

Unit II : Programming languages : machine, assembly, high level languages. Interpreter and compiler – Flow charts- Algorithm. System software and application Software. Introduction to basic language-Numeric constants and variables, string variables-symbols or arithmetic operations, Hierarchy of operations. Statements such as REM, PRINT, LET, INPUT, READ, DATA, IF-THEN, GOTO, FOR-NEXT, GOSUB-RETURN, WEND, ON-GOTO, ON-GOSUB, DIM, END. User define functions. Systems commands such as DIR, MD, CD, LIST, SAVE, LOAD, RUN, CLS, COPY, DEL, PRINT, FORMAT (2Credits)

Part B : Fundamentals of refrigeration(8 credits)

Unit III:FIRST LAW OF THERMODYNAMICS System, thermodynamic equilibrium, state, property, process, cycle, zeroth law of thermodynamics, energy, work, heat, first law of thermodynamics, PMM I, ideal gases, application of first law of thermodynamics to closed and open systems, pressure – volume diagrams, steady flow process, application of steady flow energy equation. (2 Credits)

Unit IV:. SECOND LAW OF THERMODYNAMICS Limitations of first law, statements of second law of thermodynamics, PMM II, Clausius inequality, heat engine, heat pump, refrigerator, carnot cycle, carnot theorem, entropy, temperature – entropy diagram, entropy changes for a closed system. (1Credits)

Unit V: GAS POWER CYCLES, FLUID FLOW AND VAPOUR POWER CYCLE Air standard Brayton cycle with intercooling, reheating and regeneration properties of steam, one dimensional steady flow of gases and steam through nozzles and diffusers, Rankine cycle. (1Credits)

UnitVI: RECIPROCATING AIR COMPRESSORS, REFRIGERATION CYCLES Single acting and double acting air compressors, work required, effect of clearance volume, volumetric efficiency, isothermal efficiency, free air delivery, multistage compression, condition for minimum work. Fundamentals of refrigeration, C.O.P., reversed carnot cycle, simple vapour compression refrigeration system, T-S, P-H diagrams, simple vapour absorption refrigeration system, desirable properties of an ideal refrigerant. (2 Credits)

Unit VII: FUNDAMENTALS OF HEAT TRANSFER Modes of heat transfer, Fourier's law of conduction, one dimensional steady state conduction through plane and composite walls, cylinders and spheres. Free and forced convection, dimensionless numbers, heat exchangers thermal boundary layer, heat transfer co-efficient, simple problems in fins, heat transfer between fluids separated by plane and cylindrical walls, overall heat transfer coefficient, heat exchangers, LMTD, concept of radiation- Planck's law, Wien's displacement law, Stefan Boltzman law, Black body and Grey body radiation.(2 Credits)

TEXTBOOKS

1. R.K.Rajput – “A Textbook of Engineering thermodynamics”- Laxmi Publications (P) Ltd, New Delhi-2001.
2. Biray K. Dutta – “Heat Transfer Principles and Applications”- Printice hall of India, New Delhi- 2003
3. R.Rudramoorthy- “Thermal Engineering” - Tata McGraw Publishing Co. Ltd, New Delhi- 2003

REFERENCES

1. R.S.Khurmi, J.K.Gupta – “A textbook of Thermal Engineering”- S.Chand & company Ltd- 2003.
2. E.Ratha Krishnan “Fundamentals of Engineering thermodynamics”, Eastern Economy Edition-Prentice Hall of India Private Limited, New Delhi–110 001, 2000.
3. Yunus A. Cengel, Michael A.Boles – “Thermodynamics An Engineering approach”- Third Edition- 2002.
4. Y.V.C.Rao – Heat transfer – University press, Hyderabad – 2001.