

All correspondence in respect of nominations may be addressed to :

**The Principal Director**  
**CENTRAL INSTITUTE OF TOOL DESIGN**  
(A Govt. of India Society, Ministry of SSI)  
Balanagar, Hyderabad-500 037, Andhra Pradesh, India

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## PROSPECTUS FOR

### **MASTER CERTIFICATE in MECHATRONICS 2009**



**From 16.07.2009 to 15.01.2010**

**Timings: 6.00 pm to 9.00 pm**



### **MSME TOOL ROOM. HYDERABAD**

#### **CENTRAL INSTITUTE OF TOOL DESIGN**

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## ABOUT CITD

The Central Institute of Tool Design is a premier Institute in Asia providing specialized training courses in Tool Design/Manufacture/CAD/CAM & Low Cost Automation techniques. The Institute was established in the year 1968 by the Government of India with the assistance of UNDP and ILO as an executing agency. CITD was converted into a Government of India Society in 1970 under the administrative control of the Ministry of SSI. The Development Commissioner, Small Scale Industries, Ministry of SSI, is the ex-officio Chairman of the Governing Council. The Principal Director is the Chief Executive for managing day-to-day affairs of the Institute.

The Institute has a well equipped Tool room with sophisticated systems such as CNC 5-axis & 4-axis Machining centers, CNC Lathes, CNC EDM machines, CNC wire cut machines etc., supported by Metrology equipment like CNC 3 co-ordinate measuring machine. The institute is also equipped with - Calibration center for calibration of instruments, slip gauges, Automation center with hydraulic, pneumatic, electronic & PLC laboratories, Library & Documentation

The Institute has a CAD/CAM center with powerful graphics based Compaq workstations with packages like AutoCAD, I-DEAS, Pro/ENGINEER, CATIA, ANSYS, ADINA, Master CAM, UNIGRAPHICS, DELCAM, SOLIDWORKS, NASTRON etc for imparting training and consultancy.

The Institute undertakes design & manufacturing of tooling, machining of precision components using 5-axis machine, consultancy jobs in the area of CAD/CAM, automation, & calibration services in addition to training activities in the area of CAD/CAM, tool design & automation centre.

The Institute has a special Library with a vast collection of technical books in tool engineering. The documentation centre collects and organize information and data useful for the technological advancement in Tool Engineering. For the dissemination of information, the centre publishes a computerized current awareness abstracting bulletin and provides technical enquiry service.

## GENERAL TERMS AND CONDITIONS FOR TRAINEES ADMITTED TO EVENING COURSES.

- a) No hostel facility is available and the trainees have to make their own arrangements for boarding and lodging.
- b) The trainees shall not cause any damage or loss to the property of the Institute, failing which they are liable to bear the loss.
- c) If any information given in the application by the candidate is found incorrect, the trainee is liable for such action as may be deemed fit including his/her disqualification and/or dismissal from training course.
- d) The trainees are expected to complete the assignments as per schedule of training programmers. Marks will be deducted for late submission of assignments.
- e) The trainees will have to strictly undergo the training as per the schedule and instructions and comply with all the rules of the Institute as may be in force from time to time. Copying in examination and any malpractice during the examination will be viewed seriously and entail expulsion.
- f) The trainees would complete the full course of training and will not be allowed to discontinue/rejoin the training for nay reason.
- g) The trainees are expected to maintain utmost discipline and good manners inside and outside the campus of the institute and not to get involved in activities which cause blemish to the good image of the Institute.
- h) The Institute reserves the right either to alter to postpone or drop the programme without assigning any reason.
- i) The Institute reserves the right to alter, vary, change and/or modify the rules governing the admission.
- j) The rules are liable to change from time to time depending upon exigencies of training.
- k) The Institute reserves the right to terminate the trainee at any time at its discretion for misconduct/indiscipline/irregular attendance, breach of rules etc. in such an event the course fee paid by the candidates shall not be refunded.
- l) The trainee should deposit caution money of Rs. 500/- at the time of joining the course.
- m) Fee once paid is not refundable or adjustable in any case.

**MODULE – V: MECHATRONICS TECHNOLOGY**

1. The concept of Mechanical and its scope of its application in industries for system development.
2. An exposure on CAD/CAM System for increasing quality & productivity.
3. CNC fundamentals & CNC Machine Tools & their utility in manufacturing systems.
4. An exposure on Robotics & their application for automation.
5. Introduction to Mechanisation.
6. Drive Mechanisms feeding & indexing mechanisms, orientation, escapement & sorting devices, conveyor system, etc.
7. Importance of designing & manufacturing of special purpose machines and their application in Automation & Mechanisation.
8. Exposure on flexible manufacturing system. & Automated Guided Vehicle system.
9. Typical Industrial application of Automation system.
10. Practical Project Work (System Development).
11. Modular production system.
12. sensor technology, fluid sim software for control with easy port connections

**7. FINAL EXAMINATIONS:**

At the end of Module\_v, both theoretical and practical examination will be conducted in all the five Modules and viva-voce on project work will also be conducted. The theory examinations will have maximum of 100 marks for each module and practicals will have a maximum of 250 marks and the project & viva-voce will have a maximum of 250 marks.

The candidates should secure a minimum of 40% in each module and in aggregate of 50% to become eligible for the certificate.

**8. ELIGIBILITY:-**

**Qualification-** Degree /Diploma Engineers in the disciplines of Mechanical/Production Electrical Electronics & Communication Engineering/Automobile/ITI with post qualification experience.

**9. COURSE FEE: Rs. 15,000 /-**

**Date of commencement of course: from ..... to .....**

**Course Timings: from 6.00 pm to 9.00 pm**

**NOTE:** The Institute reserves the right to extend the last date for submission of applications.

**LOW COST AUTOMATION CENTRE** will be conducting **Master Certificate course in Mechatronics & its Applications** for the benefit of working non-working technical personnel.

1. The concept of Mechatronics and the scope of its application in Indian Industries has become more relevant in the present juncture particularly for increasing productivity in views of the syntheses technological applications using not only conventional mechanical technology but also the existing engineering for the required purposes by integrating the available system concept and the interface concept which are required to merge the various technologies for certain desired functions.
2. Since the philosophy of Mechatronics is based on the system concept pertaining to the integration of the internal functions to perform the tasks, the interface concept aims to combine the various components through Functional mechanical interface, Physical interface, Information interface and Environmental interface. The main objective of this training course is to impart new knowledge to the participants on the design and applications of Mechatronics.
3. The course equips the participants to acquaint in the application of Mechatronics as they will be exposed to Fluid Power /Electical/ Electronic/Mechanical/Control Engineering to develop suitable systems for implementing Automation and Mechanisation in industries for increasing the productivity.
4. Programme presentation is supported with modern Audio Visual Equipments, Video Cassettes and Technical Films, Animated Transparencies Cut-section models and Transparent working elements, etc.
5. **PLANT VISITS:**  
As a part of the training programme, the participants will be taken to reputed Industries situated in and around Hyderabad for exposure to live problems.
6. **METHODOLOGY:**  
The programme on Mechatronics comprises of the following five modules. The duration of the each module is about 60 hrs. which include laboratory demonstration on various labour saving devices and lab exercises & project work.

**MODULE -I: APPLIED INDUSTRIAL PNEUMATICS**

1. Merits on Fluid Power its utility in industries for increasing productivity.
2. Symbolic representation of Pneumatic Elements.
3. Compressor & air line installation.
4. Transmission of Fluid Power through Various types of cylinders.
5. Pneumatic circuits for controlling of cylinders.
6. Advanced Pneumatic Circuits for different controls.
7. Electro-Pneumatics applications
8. Application of Fluidics
9. Bi-selectors
10. Programmable sequential control using modular elements
11. Practical demonstration of Pneumatic circuits, electro pneumatics, fluidics in laboratory.

**MODULE – II: APPLIED INDUSTRIAL HYDRAULICS**

1. Symbolic representation of Hydraulic elements
2. Hydraulic Control Valves
3. Hydraulic Accessories
4. Various types of pumps used in Hydraulic System
5. Hydraulic Fluid and effective contamination control
6. Hydraulic circuits for controlling of Cylinders
7. Advance Hydraulic Circuits for different controls
8. Hydro-pneumatics
9. Electro- Hydraulics and Servo Control System
10. Cartridge valve design
11. Trouble shooting and remedial measures in Hydraulic System.
12. Practical demonstration of /hydraulic Circuits, Electro hydraulic circuits, transparent working models of Hydraulic Valves, etc., in Laboratory.

**MODULE – III: MECHANICAL ENGINEERING INCLUDING MATERIAL, HEAT TREATMENT & MACHINING PROCESSES**

1. Mechanical Engineering Drawings, different types of Projection, etc.
2. Types of fits and tolerance
3. Common types & classification of tool engineering drawings.
4. Introduction to tool steels, heat-treatment and different types of heat treatment.
5. Measuring techniques & different measuring instruments used for inspection.
6. Conventional machining processes.
7. Special purpose machine & machining processes like profile grinding, jig boring, spark erosion and precision machining, etc.
8. Introduction to Jigs, Fixtures, Press Tools, Gauges, Die Casting Dies, Non-conventional machining process.

**MODULE – IV: APPLIED ELECTRICAL & ELECTRONIC CONTROLS**

1. Importance of electrical control engineering and Symbolic identification of electrical installation.
2. D.C. circuits
3. A.C. circuits
4. DC motors working principle, characteristics, applications and speed control.
5. Transformers
6. AC motors working principles, Applications
7. Measuring instruments
8. Evolution of Electronics
9. Solid state diodes
10. Transistors and Opto Electronics
11. Amplifiers & Oscillators
12. Thyristor control
13. Digital principles & logic circuits
14. Principles of Analog & Digital computers
15. Microprocessor control for Automation & Mechanisation
16. Programmable logic controllers & PLC Programming & SCADA
17. Practical demonstration in lab.