# CENTRAL INSTITUTE OF TOOL DESIGN

(A Government of India Society, Ministry of MSME)

Balanagar, Hyderabad, PIN-500037

# PROSPECTUS FOR M. E. COURSES 2024


## Contact

**Telephone:**
**9502405170,**
**040-29561795**
**E-Mail:**
training@citdindia.org

**Website:**
www.citdindia.org

## About CITD

Central Institute of Tool Design (CITD), an ISO 9001:2015, 14001:2015 & 50001:2018 certified premier technical training institution of India, established in 1968; provides specialised training courses in Tool Design & Manufacturing, CAD, CAM, CAE, VLSI, Embedded Systems, Electronics, Mechatronics and Robotics at various levels such as Certificate, Diploma, Post Diploma, Postgraduate Diploma and M.E.

The Institute was established in the year 1968 by Government of India with the assistance of UNDP and ILO as an executing agency. It was converted into a Government of India Society in 1970 under the administrative control of the Ministry of MSME. The Development Commissioner; Ministry of MSME is the ex-officio Chairman of the Governing Council. The Principal Director is the Chief Executive Officer of the Institute.

## Aims & Objectives

a) Training of the technical personnel in design and manufacture of Jigs & Fixture, Dies & Moulds, Press Tools, CAD/CAM, CAE, VLSI & Embedded Systems, Mechatronics & Robotics.

b) Provision of advisory, consultancy and common service facility & service to small scale units including assistance in the design and development of tools for various processes, Calibration of Mechanical Measuring Instruments.

c) Recommending measures to standardize tools and tooling elements, components of Jigs & Fixtures, Dies & Moulds, Press Tools, and other tools.

d) Production of Jigs & Fixtures, Press Tools, Dies & Moulds, Gauges and Special Cutting Tools subject to the condition that job works undertaken by the Institute should suit to the needs of the training.

## Facilities

The Institute has a well equipped Tool Room with sophisticated CNC machines like CNC EDM, CNC Wire Cut EDM 4-Axis & 5-Axis High Speed Machining Centres, and 3D Coordinate Measuring Machine with Scanning & Digitization facilities. The Institute is equipped with latest version of EMCO Tabletop CNC Turning and Milling machines with closed loop system to impart training in CNC Programming.

The Calibration laboratory is set up in CITD with Universal Horizontal Microscope ULM OPAL600 Carl Zeiss Technology, Germany, and Slip Gauge Measuring Unit 826 with Millitron 1240, Mahr, Germany to Calibrate Limit Gauges, Micrometers,

Dial Indicators, etc. The CAD/CAM Centre is equipped with latest configuration workstations and software like AutoCAD, Pro-E, CATIA, ANSYS, Hypermesh, Unigraphics, Master CAM, Del CAM, Nastran & Patron, ABACUS, LS-DYNA, Q-FORM, SOLIDCAST, etc. The Institute is also equipped with an Automation Centre with Programmable Logic Control Systems, Hydraulic, Pneumatic and Electronic Controls with Simulators. CITD has a Library with a collection of technical books in Tool & other Engineering fields and subscribes to various international journals like CIRP Annals, American Machinist, Journal of Engineering Materials & Technology (ASME), Precision Engineering (JAPAN) and Precision Tool Maker, etc.

The documentation centre collects and organizes information and data useful for the technological advancement in Tool Engineering. For the dissemination of information, the centre also provides technical enquiry service.

## About University College of Engineering (Autonomous), Osmania University, Hyderabad

The University College of Engineering (Autonomous), a premier Institution of the Osmania University came into being in the year 1929, and it perceives its mission as follows:

To meet the short and long-term Engineering manpower needs for social, industrial and economic development of the region and the nation through teaching and research, industrial consultancy and community service.

To promote learning in an environment conducive to free thinking and the promotion of innovation.

To promote learning in an environment conducive to free thinking and the promotion of innovation.

To cultivate the skills, attitudes, and habits of life – long learning, to be well prepared to adapt to a rapidly evolving society and the continued demands for new knowledge and skills.

To contribute to the advancement of knowledge in engineering service and technology, as well as to provide new and deeper understanding of the engineering process implicit in nature, and for the solution of engineering problems to make human living more comfortable.

To be judged by the highest standards of teaching and research, ethics and integrity, morality, and humanism.

Post Graduate programmes that prepare students to contribute to advances in engineering developments in the industry and for the community, through courses in M.E./M.Tech. Degree programmes as well as by research (M.S.)

## About M.E. Courses

Central Institute of Tool Design is conducting full-time Master of Engineering programmes in collaboration with University College of Engineering, Osmania University, in:

1. M.E. Mechanical CAD/CAM
2. M.E. Tool Design
3. M.E. Design for Manufacture
4. M.E. Mechatronics

These programmes in engineering prepare students to further their interest and develop skills in specialized areas in the above fields.

**Course Duration** – 24 months (4 semesters)

## Eligibility

**For M.E. (Mech. – CAD/CAM):**
B.E./B.Tech in Mechanical Engineering/ Production Engineering/ Mechatronics Engineering or equivalent. Minimum of 55% marks in the qualifying examination from the Institutions approved by AICTE

**For M.E. (Design for Manufacture):**
B.E. / B. Tech. in Mechanical Engineering /Production Engineering / Mechatronics Engineering / Automobile Engineering / Aeronautical Engineering or equivalent. Minimum of 55% of marks in the qualifying examination from the Institution approved by AICTE.

**For M.E. (Tool Design):**
B.E./B.Tech. in Mechanical Engineering /Production Engineering or equivalent. Minimum of 55% marks in the qualifying examination from the Institutions approved by AICTE.

**For M.E. (Mechatronics)**
B.E./B.Tech.inMechanical/ ECE/ EEE/ EIE/ Mechatronics /Automobile /Aeronautical Engineering or equivalent. Minimum of 55% of marks in the qualifying examination.

**Age** – Candidates below 45 years of age are eligible.

## For Industry Sponsored Candidates:

i. The candidates must have a minimum of two years of full-time professional work experience after passing the qualifying examination in a Registered Firm/ Company/ Industry/ Educational and Research Institutions/ Govt. Department/ Govt. Autonomous organizations in the relevant field in which admission is being sought.

ii. There will be no age restriction. However, preference will be given to those who are below 45 years of age.

iii. A letter from the employer must be furnished sponsoring the candidate for admission into M.E. (Mech. - CAD/CAM) / M.E. (Tool Design)/ M.E. (DFM)/M.E. (Mechatronics). The employer should also indicate that the candidate sponsored will not be withdrawn midway till the completion of the course.

## Reservation

Reservation exists as per Govt. of India Rules. Age Relaxation for SC/ST category candidates exist as per Govt. of India Rules.

## Mode of Application

Candidates are required to apply online at CITD website under the link ***M.E. Admissions-2024 or Scan the below QR code***

*https://tinyurl.com/citd2024*

## Application Fee

₹1500/- for General Category and ₹750/- for SC/ST Category, to be paid online while submission of online application

## LIST OF DOCUMENTS TO BE UPLOADED ALONG WITH APPLICATION FORM

i. Proof of appearing B.E./B.Tech. /AMIE final semester exams
ii. SSC Certificate (for date of birth)
iii. Previous service certificates, if any.
iv. Sponsoring letter from present employer. (For Sponsored Application)

## Mode of Admission

Admission is purely based on the rank obtained in the Entrance Test, to be conducted by CITD. Rank holders of GATE also need to qualify themselves in the entrance examination.

## Detailed Syllabus and Scheme of Examination for M.E. Courses

Admissions to the four M.E. courses will be done as per the common rank list prepared by conducting a MCQ based common entrance test.

| | |
|---|---|
| **Total Duration of The Test** | **180 Minutes** |
| **Total No. of Questions**<br>**a. 50 Questions from Common Paper**<br>**b. 100 Questions from Core Paper**<br><br>**** Detailed bifurcation is appended below*** | **150 Questions** |
| **Total Marks** | **150 Marks** |

## Common Paper (Compulsory)

### Total Marks -50 Total No. of Questions -50

1.Psychometric Test. Total Marks- 20 Total No. of Questions- 20

- Personality and Attitudinal Questionnaires.
- English Usage, Reading Comprehension and Critical Reasoning.

2.Technical Knowledge. Test Total Marks- 30 Total No. of Questions- 30

**Basic Mechanical Engineering**

Safety practices, Engineering materials, bench work & metal cutting theory, cutting tool materials & geometry, cutting fluids & its importance, Drilling, Turning & screw threads, Milling, Grinding, Manufacturing methods, Super finishing operations, Heat Treatment, Transmission of power, Bearing materials & antifriction bearings, Lubrication, steam turbines, IC Engines, Jigs & Fixtures, Non-conventional machining, Clutches & couplings.

**Basic Electrical Engineering**

Concept of Potential difference, Current and Resistance, Ohm's law, effect of temperature on resistance, resistance temperature coefficient, insulation resistance, SI units of work Power and Energy, Conversion of energy from one form to another in electrical and thermal systems, Sinusoidal

another in electrical and thermal systems, Sinusoidal voltage and currents, their mathematical and graphical representation, concept of cycle period, frequency, instantaneous, peak, average, r.m.s. values, peak factor, and form factor, phase difference, lagging, leading and in phase quantities and phasor representation.

**Basic Electronics Engineering**

Semiconductor materials-intrinsic and extrinsic types, Ideal Diode, Terminal characteristics of diode, p-n junction under open circuit condition, p-n junction under forward bias and reverse bias conditions p-n junction in breakdown region,Diode small signal model, Zener diode and applications,Rectifier Circuits, Clipping and Clamping circuits

## Core Paper Mechanical Engineering

**(Compulsory for candidates with qualification of bachelor's degree in mechanical/production/ automobile/aeronautical engineering or its equivalent)**
**Total Marks – 100 Total No. of Questions - 100**

**Engineering Materials**
Structural and mechanical properties of common engineering / metals, alloys, plastics, and ceramics. Heat treatment of steels.

**Foundry**
Patterns, pattern allowances, moulding and core making, gating and risering calculations, Casting processes; sand, die, centrifugal, investment and shell mould casting. Defects in castings.

**Welding**
Gas, arc and resistance welding. Tungsten inert gas (TIG), metal inert gas (MIG) and atomic hydrogen welding; Power sources of welding, Brazing, Soldering and adhesive bonding.

**Metal Working**
Basic plasticity for metal forming. hot and cold working, forming processes; blanking, piercing and deep drawing. Technology of wire drawing, rolling and forging processes, Force, and power calculations. Elements of powder metallurgy.

**Machine Tools**
Construction, operation, kinematics, and applications. Automatic and semiautomatic machine tools, indexing attachments. Jigs and fixtures, Elements of N/C machine tools.

**Machining Processes**
Turning, drilling, shaping, planning, boring, reaming, milling, grinding, and finishing processes. Production of Screw threads. Gear manufacturing processes; hobbling and shaping. Introduction to unconventional machining processes like EDM, ECM, USM, Laser machining etc.

**Limits, Fits and Tolerances**
Fundamental deviation, basic size, hole basis and shaft basis system, recommend fits for assembly.

**Industrial Engineering**
Plant layout and material handling. Work study. Economic analysis; break-even analysis, present value criterion. Forecasting. Elements of production planning and control; machine loading, sequencing, and inventory control. Statistical quality control. Elements of linear programming and PERT / CPM in production system.

**Strength of Materials**
Stress, Strain, Biaxial and triaxial stresses. Stress-strain relationship for elastic bodies. Mohr's circle. Theories of failure. Calculations of stresses, slope of deflection. Torsion of cylindrical shafts. Energy methods. Thin and thick cylinders. Stability of columns.

**Theory of Machines**
Constrained motion. Plane mechanisms; Velocity and acceleration diagrams. Coriolis component of acceleration. Instantaneous centre. Flywheels and their applications. Balancing of reciprocating and rotating masses. Planar cams and followers. Involute tooth geometry. Types of gears. Gear trains with fixed axes and planetary configuration, differential. Natural and forced vibration with and without damping for systems with single degree of freedom. Transmissibility and isolation of vibration. Transverse vibrations of beams and shafts, Critical speed. Multi rotor torsional vibratory systems. Principle of gyroscope.

**Machine Design**
Material and manufacturing considerations. Design of elements subjected to static and variable stresses. Factor of safety. Stress concentration. Design of flanged joints and seals, shafts and keys, helical springs, rigid and flexible. couplings, universal (Hooke's) joints, Oldham coupling, Clutches and brakes, belt, chain, and rope drives. Hydrodynamic lubrication. Rolling element bearings. Power screws. Design calculations of spur and helical gears. Indian Standards and specifications.

**Statics**
Simple applications of equilibrium equations.

**Dynamics**
Simple applications of equations of motion. Simple harmonic motion. Work, energy, power.

**Production Management**
Method and time study, motion economy and workspace design, operation, and flow process charts. Product design and cost selection manufacturing process. Break-even analysis, Site selection. Plant layout. Materials handling, Selection of equipment for job shop and mass production, Scheduling, dispatching, routing.

**Metrology**
Measurements, linear angular comparators, measuring instruments.

**Engineering Drawing**
First angle and third angle projections, Sections of solids, Missing lines, views, representation of screw threads, Ability to visualize in three dimensions and represent them in isometric / orthogonal / perspective views.

## Core Paper Electronics Engineering

**(Compulsory for candidates with qualification of bachelor's degree in electronics/electrical & electronics/electronics & instrumentation/mechatronics engineering or its equivalent)**
**Total Marks – 100 Total No. of Questions – 100**

**Electrical Technology**
Analysis of DC & AC circuits, Requirement of star-delta connection, Impedance matching for maximum power transfer, Familiarization of Primary & Secondary cells, Ampere-Hour rating, Charging & Discharging of capacitor, Familiarization with ammeter, voltmeter including extension of range, Domestic wiring, working of fluorescent lamp, sodium vapour lamp, Principle of control panel designing & wiring, Familiarization of single phase transformer , special transformers ,Generators, DC Motor with characteristics, Three phase induction motor, Single phase motor.

**Analog Electronics**
Familiarization of Voltage & Current (DC & AC) with different parameters, Different types of signals, P-N junction ,Diode theory & applications(Basic Gate, Peak Detector,Clippers,Clampers,Tripler,Quadrupler,Four Diode Switch, Wave shaper), Familiarization of special purpose diodes, Familiarization of Rectifier with & without filter, Zener diode as regulator, Transistor fundamentals with applications, MOSFET & its characteristics OP-AMP fundamentals & applications, Application of Schmitt trigger using comparator ICs.

**Digital Electronics**

Boolean Algebra, Logic circuit design using Boolean expression, Karnaugh map technique & Quine McKluskys method, Combinational Logic, Flip-Flops, Timing Circuits, Sequential logic design(Counters & Shift Registers), Data Converters, Logic families, Memory Devices.

**Electronics Test & Measurement Methods**

Working principle & performance check of Oscilloscope, Functions Generator, Frequency Counter, Pulse Generator & Multimeter, Sensors used in industrial applications, Different types of transducers, Different types of displays used in industrial applications, Actuators & Annunciators used in control applications.

**Electronic Instrumentation**

Op-Amp as (summing Amplifiers, Differentiators, Integrators, V-I & I-V Converters), V-F & F-V converters, Different types of temperature sensors, Force & weight transducers, Pressure transducers, Motion Transducers, Digital Transducers, Automatic Test Equipment.

**Industrial Electronics**

Selection of power switch for a given application, troubleshooting of driver circuit for switch, Designing, testing, and winding of inductors for given specification, Design, testing and troubleshooting of DC-DC converters, Selection of heat sink for a particular application, working of controlled rectifiers with inductive load, Troubleshooting of gate trigger circuit for controlled circuits.

**Control Systems**

Terminologies of control system, Block diagram representation for transfer functions, Description of electrical networks, mechanical, fluid & thermal systems in terms of mathematical modeling, ON-OFF Controller, Integral controller, derivative controller controller, Digital controller & controller tuning.

**Measuring Systems**

V-F & F-V converters, Different types of temperature sensors, Pressure transducers, Displacement Measurement, Force, Weight, Flow Measurement, Speed Measurement, Ultrasonic Measurement.

**Microprocessor & Microcontroller**

Architecture & programming of 8085, Development of software applications for industrial control application, Memory interfacing techniques, Traffic light interfacing, Stepper motor interfacing, Keyboard interfacing, Display interfacing, DC motor control, Stepper motor control, Architecture & Programming of 8051, Timers & Counters, Serial Communication, Interrupts, Interfacing of

ADC,DAC,LCD,LED,Stepper Motor, Sensors.

**Applied Mechanics**
Forces, Strength of materials, Simple machines, Basic kinematics, Transmission of power & motion, Gear driver.

**Production Management**
Method and time study, motion economy and workspace design, operation, and flow process charts. Product design and cost selection manufacturing process. Break-even analysis, Site selection. Plant layout. Materials handling, Selection of equipment for job shop and mass production, Scheduling, dispatching, routing.

**Engineering Drawing**
First angle and third angle projections, Sections of solids, Missing lines, views, representation of screw threads, Ability to visualize in three dimensions and represent them in isometric / orthogonal / perspective views.

## PSYCHOMETRIC TEST

### Duration of Entrance Exam
1½ hours (Objective Type 100 Questions).

### Declaration of Result
Merit list of the candidates will be displayed on the notice board of the institute as well as on Website www.citdindia.org

### Admission Counselling:
The candidates will be called for admission counselling as per the merit list.
Based on the rank and availability of seat, the candidate can take admission to the course of his choice.

### Rules of reservation of seats for SC/ST/PWD Candidates
a) SC/ST candidates who get seats by merit in general category will not be counted against the seats reserved for them and such candidates will go into the list of general seats.

b) If enough candidates are not available to fill-up the seats reserved for SC, they shall be filled up by the suitable candidates from ST category and Vice-versa. If, the required numbers of candidates are not available for filling the SC/ST reserved quota, the seats will be filled up by candidates from the general pool based on merit.

c) Candidates claiming reservation under SC/ST/OBC(NCL) category are required to produce a certificate from the

competent authority.

d) The candidates claiming reservation under Persons with Disability category, is subject to production of a medical certificate from competent authority.

e) If no candidate under Persons with Disability category is available, the seat will be filled by the candidate from Non-sponsored General category based on merit.

## Course Fee

### For Self Sponsored:

The candidates selected have to remit course fee of Rs. 41,000/- per semester at the beginning of each semester either in Online Mode, Bank Challan or DD in favour of the Principal Director, CITD, Hyderabad.

### For Industry Sponsored:

The candidates selected have to remit course fee of Rs. 51,000/- per semester at the beginning of each semester either in Online Mode, Bank Challan or DD in favour of the Principal Director, CITD, Hyderabad.

### Autonomous fee & Caution Deposit

In addition, the candidates have to pay one time Autonomy fee of Rs.9,770/- (OU Autonomy) along with caution deposit of Rs.1,000/- (refundable on completion of the course) at the time of admission.

### Scholarship

No candidate is eligible for any Scholarship from the Institute/Osmania University or AICTE.

However, they can apply for fee reimbursement / scholarship at various other organisations (Their respective state governments/ NSP/ others).

### Documents to be Handed Over at The Time of Admission:

*(To be returned as deemed fit within 60 days or after verification and record, whichever is earlier).*

a) Original certificates of qualifying examination i.e. B.E or B.Tech.
b) T.C & Bonafide of the college.
c) Migration Certificate (if applicable)
d) Case Certificate (if applicable)
e) PWD Certificate (if applicable)
f) Certificate of Physical fitness from any Assistant Civil Surgeon. The Institute reserves the right to send the candidate for further medical examination, if necessary.

g) An undertaking for good conduct and behaviour and to abide the rules & regulations as prescribed by the Institute.

## Provisional List of Selected Candidates

The provisional list of selected candidates will be displayed on Website/Notice Board of Central Institute of Tool Design, Balanagar, Hyderabad.

## Classes will be conducted at the following places:

- At Central Institute of Tool Design, Balanagar, Hyderabad : Monday, Tuesday & Wednesday (from 09.30 a.m. to 06:00 p.m.)

- At Mechanical Engineering Department, University College of Engineering, Osmania University, Hyderabad : Thursday, Friday & Saturday (from 09.00a.m. to 05.30p.m.)

## Holidays & Working Hours

a) The Institute follows the holidays as applicable to Central Government.
b) The Institute working hours are from 09.30 a.m. to 06.00 p.m.
c) The Institute will work on 2nd Saturday also.
d) Weekly holiday – Sunday.

## Scheme of Instruction, Examination & Award of Division

As per the norms of Osmania University from time to time.

## Award of Degree Certificate

Osmania University will award the Masters of Engineering Degree certificate for successful candidates.

## General Terms and Conditions

a) The Institute reserves the right not to conduct any course at its sole discretion.

b) The course fee for next semester should be paid within a month of the beginning of the new semester.

c) No travelling allowance or any other allowance will be paid for attending entrance examination, joining the course or on termination thereof.

d) The student shall not cause any damage or loss to the property of the Institute/ University, failing which they are liable to bear the loss.

e) Any information given in the application by the candidate, if found incorrect even after admission, punishment as may be deemed fit including his/her disqualification and/or dismissal from the course may be awarded.

f) Fee once paid will not be refunded.

g) The Institute reserves the right to terminate the student at any time at its discretion for misconduct/indiscipline, breach of rules, etc. In such an event the course fee paid by the candidates shall not be refunded.

h) The rules are liable for change from time to time depending upon exigencies of the course.

i) All matters concerning the admissions and conducting the courses shall be subject to Hyderabad jurisdiction only.

## Important Dates

**Commencement of Online Application : 03-06-2024 (Monday), from 11:00 AM**

**Closing of Online Application : 12-07-2024 (Friday) at 11:59 PM**

**Date of Entrance Exam (Tentative) : 14-07-2024 (Sunday)**

**Centre for Entrance Examination : Hyderabad**

### Contact Details:

Admission Desk at Diploma Block
Phone No.- 9502405170, 040-29561795
E-Mail:- training@citdindia.org
Website: www.citdindia.org