NATIONAL INSTITUTE OF TECHNOLOGY TIRUCHIRAPPALLI

Department of Metallurgical and Materials Engineering (MME)

ONE YEAR

SELF – SUPPORTING

ONLINE CERTIFICATE COURSE

IN STEEL TECHNOLOGY

Brochure – Version Aug 18 2023

Last date for submitting application – SEPT 30 2023

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BACKGROUND

The Indian steel industry has been making rapid strides, in production capacity and in technology. We, INDIA, are **the second largest steel producing nation in the world**, as of 2023. Our steel production capacity is all set to grow from one hundred million Tonnes per annum (mTpa) few years ago – to three hundred mTpa by the year 2030. While this needs huge capital investment, this **also needs well trained and highly motivated manpower**. NIT Trichy has stepped into this **wonderful opportunity**; and wishes to contribute to the Nation and to the Indian steel industry.

Government of India (GoI) has been taking lots of efforts for improvement of the Nation, including initiatives such as the **National Education Policy 2020** (NEP),

operated through the Ministry of Education (MoE). Quoting from Section 20.6 of the NEP – 'there will not only be a greater **demand for well qualified manpower** (in various sectors), it will also require closer **collaborations between industry and higher education Institutions** (HEI) to drive innovation and research'. Section 21 of the NEP emphasizes **life-long learning**; and adds that technology - based options (such as Apps, **online courses**) should be developed by HEIs. In addition to these, several HEIs carry the burden of recurring repayments against 'HEFA loans'; and hence the associated need for **enhanced internal revenue generation**.

NIT TRICHY

The National Institute of Technology Tiruchirappalli (NIT Trichy) is an Institution of Higher Learning and is a Centrally Funded Technical Institution (CFTI). NIT Trichy has been consistently ranked as **the best amongst all NITs** (as in NIRF). NIT Trichy has started the Diamond Jubilee celebrations (marking sixty wonderful years of service). NIT Trichy is well known for its academic initiatives and intense research efforts. Alumni of NIT Trichy occupy very high positions in the academia, service sector and industry. Our alumni have also done extremely well as entrepreneurs.

Dept MME

The Department of Metallurgical and Materials Engineering (MME), **affectionately referred to as META**, is one of best departments in NIT Trichy. The department offers BTech, MTech, MS and PhD programmes. The department is student friendly, committed to teaching and performs very well in research and consultancy. One Professor of this dept had served as the Director of MANIT Bhopal and another Professor of this dept had served as the Director of NIT Warangal. Yet another Professor of this dept had served as the Director in charge, of NIT Trichy. The faculty of this dept are well connected with the industry. About half of the present faculty of this dept have worked in research activities in North America, Europe and Australia.

Many alumni of this dept are in lead roles in the industry, including primary metal production. One of our senior alumni is managing one of the best blast furnaces in India; another senior alumnus is holding a key position in senior management in a prominent steel company in India; and one of our young alumni is a key player in the

best agglomeration unit in India. One of our senior alumni had served as the President of the Indian Institute of Metals (IIM).

Overview of the Course

This online course has twin objectives:

- enhancing the capabilities of technicians and engineers already serving in steel plants and allied industries*;

- sensitizing engineering graduates (including final year students) about opportunities in the steel industry and preparing them for career in the steel industry.

Considering the fact that steel production is a huge manufacturing activity; and that all kinds of engineers are needed in the steel plants, this course will be open to all technical disciplines.

As technicians and engineers in the industry find it difficult to take months off for further studies, the entire course will be offered online. This online schedule will also be helpful for learners outside the industry as well.

Further, the online classes shall be held **between 630 pm and 900 pm, (Indian Standard Time), Monday to Friday**. Live lectures shall be delivered.

Lecture materials will be made available, online, for short period of time – after the delivery of lectures.

Saturday slots (between 1000 am and 500 pm) (some weeks) may be used with information in advance. Saturday slots may also be used for the online assessment activities.

(* described elsewhere in this brochure)

Eligibility

Applications are invited from the following five categories of applicants:

1. Technicians / engineers **working** in steel plants and allied industries; with **Diploma** (three year engineering diploma, any branch) OR **BSc** (three year degree in science, any branch) OR **BE / BTech** (four year degree in engineering, any branch); and with

minimum three years of working experience; and **fully sponsored by the organization** (organization pays the full fees directly to NIT Trichy); (with pass in cited diploma / degree); (AMIE / AMIIM holders shall also be considered subject to prevailing guidelines)

2. Technicians / engineers **working** in steel plants and allied industries; with **Diploma** (three year engineering diploma, any branch) OR **BSc** (three year degree in science, any branch) OR **BE / BTech** (four year degree in engineering, any branch); and with **minimum three years of working experience**; and **partly sponsored by the organization** (employee pays the full fees to NIT Trichy, and the organization reimburses the employee subject to internal guidelines of the organization); (with pass in cited diploma / degree); (AMIE / AMIIM holders shall also be considered subject to prevailing guidelines)

3. **Engineering graduate**, with BE / BTech (any branch), with **minimum 60% marks or 6.5 CGPA or equivalent**; (AMIE / AMIIM holders shall also be considered subject to prevailing guidelines); MSc graduates shall be treated at par with BE / BTech graduates;

4. **Students of final year engineering**, BE / BTech (any branch), with **minimum 60% marks or 6.5 CGPA or equivalent**, and having passed all subjects up to fifth semester of the BE / BTech, as on the date of reference for application processing (**July 31 2023**);

5. (**As a special case for the first batch in this course**) – Any student (full time / part time) of NIT Trichy (or any other CFTI) pursuing BTech / MTech / MS / PhD (in Science and Engineering) – having completed three years of studies at the Bachelor's level – and having passed all subjects up to the even semester of academic year 2022 – 2023; and taking this online course as additional learning beyond the defined requirements of their academic programmes.

Admission Procedure

Admission to NIT Trichy is typically based on entrance examinations such as JEE, GATE. This course is to address the needs of the steel industry; and is an enabling measure; and **admission is open without any typical entrance examination**.

Therefore, all technical personnel with interest in steel industry will be able to go through the admissions process, subject to admission guidelines described elsewhere in this brochure.

Advertisement for admission to this **One Year Self – Supporting Online Certificate Course in STEEL TECHNOLOGY** shall be released by **July 31 2023**. (Portal will be opened for online filling of applications). Interested persons will have to submit a duly filled application form, with supporting documents. There shall be an **application fee** of Rupees Four Thousand only, plus GST, per person (for those applying from within India); and US Dollars One Hundred only, plus applicable taxes, per person (for those applying from outside India). For applicants from outside India, offer of admission is subject to prevailing policies of the Government of India. **Application fee is non-refundable**. NIT Trichy reserves the rights for offer of admissions. **NIT Trichy reserves the rights to offer or not to offer the course, after processing of applications**.

In the categories of fully sponsored and partly sponsored candidates, it is unlikely that there will be any criteria for shortlisting, on top of the eligibility defined elsewhere in this brochure. In the other three categories (3, 4, 5), shortlisting may be done based on marks (or grades) obtained. In these three categories (3, 4, 5), it is proposed that maximum forty percent of the seats be set aside – together – for metallurgy, chemical, mining and ceramics branches – so that many graduates / students of other branches will also be able to join and benefit from this online course.

For the first batch of this course, the total number of seats for admission shall **be restricted to 750 only**.

Course Fees

Consolidated fees of Rupees Two Lakhs plus applicable GST, per person, for the entire course, for applicants from within India. Overseas candidates will be expected to pay consolidated fees of US Dollars Four Thousand only (SAARC Nations) plus applicable taxes, per person; and fees of US Dollars Six Thousand only (overseas, other than SAARC Nations) plus applicable taxes, per person.

Discount of thirty percent in course fees is proposed for women and third gender.

Discount of thirty percent in course fees is proposed for full time students of CFTI and any academic Institution recognized by UGC or AICTE.

Organizations **sponsoring thirty or more eligible applicants** can request for **thirty percent discount**; and the discount has to be approved by NIT Trichy.

Any applicant can claim **only one discount**.

Curriculum

The outline and curriculum of this online course have been duly discussed in the department, approved in the Board of Studies of the department, approved in the Senate (59th meeting of the Senate of NIT Trichy, January 2023); and then cleared by the Institute administration.

Students of full time BTech programme may often carry an academic work load of six theory courses plus two laboratory courses, earning about twenty credits, per semester. The total academic work load of this course is comparable to what a student of engineering will study in one semester. The online classes, however, will be spread over two terms (two semesters). The following subjects will be offered:

a. **Five core theory subjects** (two credits each) – thermodynamics and kinetics; ferrous physical metallurgy; ferrous metal forming; iron making and steel making; ladle metallurgy and continuous casting of steels

b. **Two laboratory subjects** (one credit each) – ferrous metallography; manufacturing processes

c. **One comprehensive viva subject** (one credit) (written test and viva, overall competency)

d. **One elective theory subject** (two credits each) (minimum three distinct electives shall be offered to the first batch) – to be chosen from - corrosion and surface engineering; welding engineering; non-destructive testing; quality management; design and selection of materials.

Student of this course will earn a **total of fifteen (15) credits**.

Schedule (Version August 18, 2023)

July 31 2023	**Portal opens** for online filling of Applications
Sept 30 2023	**Portal closes** for online submission of Applications
Oct 9 2023	Release of provisional selection list for admissions
Oct 31 2023	Last date for payment of full fees
Nov 9 - 11, 2023	Three - day campus immersion programme in NITT
Nov 20 2023	Start of Online Classes (first term)
March 2024	Completion of first term
April 2024	Start of online classes (second term)
August 2024	Completion of second term
Sept 2024	Announcement of final results

NIT Trichy reserves the right to modify the above schedule.

Depending on requests from students of this online course (**after** start of the online course), **four distinct periods of three days each shall be identified within the academic calendar** – during which – interested students can visit the campus – for meeting the course faculty and / or seeing the lab facilities. This will require organizational planning, prior scheduling and advance registration. Visits by course faculty to couple of locations across the Nation – to enhance the interaction with students – may also be arranged, subject to approval, after start of classes.

Academic Requirements

1. Students are expected to attend all classes and all assessments.

2. Student has to maintain minimum of 75% attendance in each subject, in order to be permitted to appear in the final assessment for that subject.

3. Student has to score minimum of 30% marks in the cumulative internal assessments in order to be permitted to appear in the final assessment, in each subject.

4. Student has to score minimum of 30% marks in the final end – semester assessment in order to be considered for a pass in the coursework, in each subject.

5. Combining the cumulative internal assessments and the final end – semester assessment, **student should have at least 40% marks, as the passing minimum, in each subject**.

6. Students who have missed any assessment due to genuine difficulties (and students who have not scored the passing minimum) may be offered an opportunity for re-assessment, subject to further guidelines and an additional fee of Rupees Five Thousand, per subject, per student, for the re-assessment activity.

7. **Only students who have passed all cited subjects will be awarded the CERTIFICATE in STEEL TECHNOLOGY**.

Examinations

All classes and assessments shall be conducted online. There shall be no additional fees for the regular assessment activities.

Option for taking examinations in person may be considered, in case of any request from the students.

Students working in steel industry may be permitted to carry out a mini project (in lieu of written test component) for the comprehensive viva subject – subject to further guidelines.

Allied Industries

Making and shaping of steel is an activity that happens in steel plants, but needs **support from (and participation of) many other industries**. **Indicative examples**: (in addition to steel plants) Mining, Mineral Processing, Metallurgical chemicals, Refractories, Design and production of plant machinery, Scrap Processing, Ferro alloys, Steel foundries, Re-rolling mills, Sensors, Testing laboratories, Energy audit,

Pollution control, Direct industrial users of steel and so on. Applications from employees of all such organizations (allied industries) will be treated as eligible for admission to this course.

About the Team

Dept MME has superb faculty, working in different aspects of metals and materials; and many of them will be delivering lectures for this online course. Limited number of lectures may be delivered by subject experts outside NIT Trichy also. The coordinating team consists of:

Principal Coordinator	Dr SankaraRaman Sankaranarayanan (Professor)
Co-coordinators	Dr S P Kumaresh Babu (Professor)
	Dr S Muthukumaran (Professor and Head MME)
	Dr S Jerome (Associate Professor)

Prof SankaraRaman Sankaranarayanan is the Principal Coordinator for this online course. Prof Raman studied in PSG Tech, Coimbatore; and Drexel University, Philadelphia, USA. Much of his research work for the PhD degree (mould powders for continuous casting) was carried out in the US steel industry. He was also a post – doctoral researcher at Carnegie Mellon University, Pittsburgh, USA – working on continuous casting mould simulator (high temperature experiments). He served for short period in the Indian steel industry, with emphasis on metallurgical chemicals. He has been with NIT Trichy for twenty five years; and enjoys teaching. He and his team have built good rapport with the steel industry.

Prof S P Kumaresh Babu is a co-coordinator for this course. Prof Babu studied in PSG Tech, Coimbatore; NITK Suratkal; and NIT Trichy. He is an expert in corrosion engineering, surface engineering and foundry technology. He and his team have built good rapport with foundries and with heavy engineering industry. He is well known for

his research work addressing acute problems in the mining industry. He is also heading the Centre of Excellence in Corrosion and Surface Engineering (CECASE).

Prof S Muthukumaran is a co-coordinator for this course. Prof Muthu studied in NIT Trichy; and BIT Mesra. He works in welding engineering, NDT and manufacturing. He is very well known for his work on the Joining of dissimilar materials. He is very keen on innovation; holds a few patents; and has been the lead here in the domain of IPR. Recently, he has also floated a start up with the intention of helping victims of floods. Prof Muthu is currently heading the dept MME.

Dr S Jerome is a co-coordinator for this course. Dr Jerome studied in CIT, Coimbatore; and NIT Trichy. Dr Jerome works extensively in Welding; and has also been working in Additive Manufacturing (AM). He supervises a very dynamic research group in these areas. His research efforts in AM have been appreciated by GoI agencies. In recent years, he has connected well with the steel industry. He also played a key role in our recent efforts for NBA accreditation of the BTech (MME) programme; and helped us obtain accreditation rating of six years.

Funds saved (after all expenses associated with this online course) shall be used for **establishing an industry - oriented Ferrous Process Metallurgy Research Centre**, in NIT Trichy.

Disclaimer

a. The proposed online course does NOT offer a degree.
b. The proposed online course does NOT meet the standard definitions / typical names of higher education programmes (courses) listed by UGC / AICTE.
c. NIT Trichy will NOT offer any placement process for students of the proposed online course.
d. All privileges and facilities extended to regular full-time students of NIT Trichy will NOT be automatically extended to students of this proposed online course.

e. Students of NIT Trichy who wish to join this online course may do so fully out of their own interest and as an additional effort; but the credits earned here will not meet the credit requirements of their (main) academic programme/s.

Contact Information

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THANK YOU.

We welcome you all to NIT Trichy; and to this one - year self - supporting online certificate course in **STEEL TECHNOLOGY**. Let us all benefit from the **NEP 2020**; and serve as **catalysts for the Indian STEEL industry**.