

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

Dept MME / SRS / IMSM / V Sem / version OCT 2019 / pp 4

(Important details already conveyed to the class)

COURSE OUTLINE TEMPLATE			
Course Title	IRON MAKING AND STEEL MAKING		
Course Code	MT PC 21	No. of Credits	Four (3 1 0 4)
Department	MME (Meta)	Faculty	Prof SankaraRaman Sankaranarayanan (SRS)
Pre-requisites Course Code	MTPC 13 Metallurgical Thermodynamics and MTPC 17 Transport Phenomena		
Course Coordinator(s) (if, applicable)	SRS (Raman)		
Other Course Teacher(s)/Tutor(s) E-mail	(others: Nil) raman@nitt.edu	Telephone No.	98947 02353 X 3450 (MME office)
Course Type	Core course (BTech MME Programme Core)		
COURSE OVERVIEW			
A first course in iron making and steel making (IMSM); awareness about steel industry			
COURSE OBJECTIVES			
<ol style="list-style-type: none"> 1. Become familiar with iron making and steel making 2. Understand how principles of thermodynamics and metallurgical transport phenomena are used in iron making and steel making 3. Become aware of the steel industry 			
COURSE OUTCOMES (CO)			
Course Outcomes		Aligned Programme Outcomes (PO)	
1.	Classify furnaces and equipment used for IMSM	[10, 11, 5]	
2.	Analyze factors influencing the quality of product	[10, 11, 5]	
3.	Analyze irregularities and causes of failures	[2, 1]	
4.	Compare the traditional steel making to modern day manufacturing routes for the improvement of quality and productivity	[11, 1, 2]	

COURSE TEACHING AND LEARNING ACTIVITIES

Indicative sequence:

1. (Details already available in the NITT web page of cited teacher)
2. Initial: Introduction to the steel industry and sequence of operations in the steel plants
3. Blast furnace iron making and alternate routes of iron making
4. Oxygen steel making
5. Electric steel making
6. Refining of liquid steel
7. Continuous casting of steels
8. (Input on aspects related to energy, environment, quality, productivity)
9. **(Appropriate numerical problems on selected topics in IMSM)**
10. (Mode of delivery: predominantly chalk and talk)

COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1.	One mid-term test	Week of Oct 14	One hour	20%
2.	One assignment	Week of Oct 28	Preparation possibly ten hours	20%
3.	Viva (oral Q&A session)	Week of Nov 4	Possibly Ten minutes per student	20%
4.	End semester / final exam on full syllabus	(Common schedule)	Three hours	40%

ESSENTIAL READINGS: Textbooks, reference books Website addresses, journals, etc

(Reading materials already listed in NITT web page of teacher)

Primary text:

Ahindra Ghosh and Amit Chatterjee, Iron making and steel making: Theory and practice, PHI EEE, New Delhi, 2008 (listed price Rs375/-) **(students advised to have a personal copy – for usage during the course and for subsequent reference)**

COURSE EXIT SURVEY (mention the ways in which the feedback about the course is assessed and indicate the attainment also)

Feedback encouraged; (will use input from dept MME for format etc)

COURSE POLICY (including plagiarism, academic honesty, attendance, etc.)

Students expected to participate in earnest and honest manner

Active discussion encouraged in the class room

Students will be **mentored** towards challenges in / competitions organized by the steel industry

Students expected to attend all classes

Attendance requirement – vide **prevailing policy**

ADDITIONAL COURSE INFORMATION

Contents of this IMSM course will also be useful if the student opts to attend an **elective in process modeling** OR an **elective in ladle metallurgy and continuous casting**;

Subject to Institute guidelines, effort will be made towards guest lectures by external experts.

Subject to Institute guidelines, effort will be made towards visiting a steel plant (has materialized only for some batches).

INSTRUCTIONS Regarding ASSIGNMENT:

(teams of four or five students each)

(one submission per team)

(requires independent reading)

(consultation with the teacher – strongly recommended)

Topics, as listed here: (teams and topics to be decided **by Oct 14**)

1. Trends in steel production, National and international
2. Issues related to raw materials for the Indian steel industry
3. Efforts towards using lean ore and fine ore
4. Efforts towards using non-coking coals
5. Operational problems in blast furnace iron making

6. Utilization of steel plant wastes
7. Alternate iron making processes
8. Developments in Oxygen steel making
9. Developments in Electric steel making
10. Control of Sulphur and Phosphorous
11. Advanced High Strength Steels, for Automotive applications
12. Product Development efforts by the Indian steel industry
13. Opportunities to become supplier to the steel industry
14. Developments in fluxes and slags
15. Recent trends in process control
16. Thin Slab Casting process

FOR SENATE'S CONSIDERATION

Course Faculty __SRS__ **CC-Chairperson** _____ **HOD** _____