

**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

**Dept MME (Meta)**

**SRS / JSL Driven SS elective / AUG 2022 / v DEC 4 2022 / pp 4**

(Important details already conveyed to the class)

<b>COURSE OUTLINE TEMPLATE</b>			
Course Title	<b>Elective: STAINLESS STEELS AND ADVANCED FERROUS ALLOYS</b>		
Course Code	<b>MT PE 27</b>	No. of Credits	<b>Three (3)</b>
Department	<b>MME (Meta)</b>	Faculty	<b>Course driven by JSL;</b> along with local coordination and academic procedures by Prof SankaraRaman Sankaranarayanan (SRS)
Pre-requisites Course Code	<b>NIL</b>		
Course Coordinator(s) (if, applicable)	SRS (Raman)		
Other Course Teacher(s)/Tutor(s) E- mail	(others: JSL / Sri Rana) <b>raman@nitt.edu</b>	Telephone No.	<b>98947 02353</b> X 3450 (MME office) WA: <b>9385612153</b>
Course Type	<b>Programme Elective (BTech MME Programme)</b>		
<b>COURSE OVERVIEW</b>			
A <b>course</b> on <b>STAINLESS STEELS – strong industrial perspective</b>			
<b>COURSE OBJECTIVES</b>			
To understand the processing, physical metallurgy, corrosion behaviour and applications of stainless steels			
<b>COURSE OUTCOMES (CO)</b>			

Course Outcomes		Aligned Programme Outcomes (PO)		
CO 1. Explain the various types of stainless steels and their engineering applications		[1, 2, 3]		
CO 2. Understand the influence of various alloying elements on microstructure, precipitation, mechanical properties and deformation mechanisms of stainless steels		[1, 3, 4, 12]		
CO 3. Understand the manufacturing and processing of stainless steels for various applications		[1, 2, 3]		
CO 4. Analyse and interpret the various types of corrosion in stainless steels and their prevention		[1, 3, 6, 7]		
CO 5. Understand the physical metallurgy of various advanced ferrous alloys like, maraging steels, high N steels, high Si steels, etc		[1, 2, 3, 12]		
<b>COURSE TEACHING AND LEARNING ACTIVITIES</b>				
Team of experts from JSL and Retired faculty of IITs – as arranged by JSL				
<b>Indicative sequence:</b>				
(Syllabus listed in the web site NOT to be taken as rigid point of reference. Shall evolve.)				
Stainless Steels (and advanced ferrous alloys) – historical background, industrial developments, links to the economy, scenario of Indian and international production, investments, market scenario, market development, physical metallurgy, classification, phase transformations, alloy design and development, mechanical properties, corrosion resistance, liquid metal processing, special treatments such as the AOD, solidification, some details of the CC process, metal forming, product development, application and service perspective, ....				
(Mode of delivery: <b>HYBRID</b> : online and in person)				
(Prof Raman will attend the JSL SS classes; coordinate; and perform the assessment, with possible inputs from the experts)				
<b>COURSE ASSESSMENT METHODS</b>				
S.No.	Mode of Assessment	Week/Date	Duration	% Weightage

1.	One mid-term test	(to be announced)	One hour	20%
2.	One assignment	(to be announced during the term)	Preparation possibly ten hours	20%
3.	Surprise Test OR additional assignment	Later part of the term	To be confirmed	20%
4.	End semester / final exam on full syllabus	(Common schedule)	Three hours	40%

**ESSENTIAL READINGS:** Textbooks, reference books, Websites, journals, etc

--

**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)

**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 elective course will be very useful to those opting to join the steel industry

---

**INSTRUCTIONS Regarding ASSIGNMENT:**

**(teams of three or four students each)**

(one submission per team)

(requires independent reading)

(consultation with the teacher – strongly recommended)

---

**FOR SENATE'S CONSIDERATION**

---

Course Faculty \_\_SRS\_\_    CC-Chairperson \_\_\_\_\_    HOD \_\_\_\_\_