

TSF8		TSF8- SUPERIOR TECHNICIAN FOR THE PRODUCTION AND MAINTENANCE OF THE RAILWAY VEHICLE-Maintenance Path				
primo semestre	DISCIPLINE DI BASE	TEORIA	LAB.	Contenuti	CFU	
Mod.1/ITS	Lingua Inglese e Comunicazione in Inglese	60	60	Dedicated to the study and strengthening of grammatical structures required by the B2 level CEFR. The module focuses on the main grammatical structures of the English language. The oral-communicative aspect and communication in L2 are privileged. Students are involved in activities of Brain storming, Role play, Pair work and in exam simulations. From an operational point of view, the first semester levels the class skills in order for an admission to a 5th or 6th level.	8,4	
Mod.2/ITS	Gestione delle informazioni e informatica. (diviso in due sub moduli per ECDL base e avanzato). Raggiungimento Certificazione ECDL avanzato	50	50	Knowledge and skills useful to access the world of work more easily and to live active citizenship. It includes the following modules: Fundamentals of Information Technology / IT basic concept-Management of basic functions of the operating system / O.S. Basic Management - Word Processing / Word Processing - Spreadsheet / Spreadsheet - Databases / Structured Data Management - Multimedia Presentations / Slideshows - Internet & Networking.	7,0	
Mod.3/ITS	Matematica	50	20	Geometria Analitica – elementi di algebra – Derivate - Trigonometria – I numeri complessi – Funzioni – Integrali – Statistica descrittiva - Concetti generali su insiemi – funzioni goniometriche ed esponenziali	5,8	
Mod.4/ITS	Fisica + Teoria della misura e dell'errore	40	20	Kinematics - Dynamics - Forces - Static - Friction - Diagram of motion with Excel - electrodynamics - thermodynamics - fluid dynamics - the uncertainty of a measurement - In-depth analysis of measurements and errors - Directly proportional quantities - Insights on "dimensioning" measurement - use of measurement tools mechanical and electrical measurement	4,8	
Mod.5/ITS	Sicurezza nei luoghi di lavoro. Raggiungimento attestato corso	35	0	Community and national legal principles - Safety figures - Work environments and transversal risks - Physical risks - Safety risks - Safety on construction sites - Competent doctor and Health Surveillance - Notions of communication techniques	3,5	
Mod.6/ITS	Elettrotecnica	50	20	Definition and circuit parameters - Complex numbers - Power and power factor correction - Network theorems - Polyphase systems - Direct and alternating current measurements - Resistance measurements - Power, voltage and current measurements in three-phase systems	5,8	
TOTALE		285	170		35,3	

secondo semestre	DISCIPLINE DI BASE	TEORIA	LAB.	Contenuti	CFU
Mod.07/ITS	Lingua Inglese e	60	60	In the second semester, the class is admitted to take a 7th level and in cases of reward for the student an 8th corresponding to a	8,4
Mod.08/ITS	Gestione delle informazioni e informatica. (diviso in due sub moduli per ECDL base e avanzato). Raggiungimento Certificazione ECDL avanzato	50	50	Knowledge and skills useful to access the world of work more easily and to live active citizenship. It includes the following modules: Fundamentals of Information Technology / IT basic concept-Management of basic functions of the operating system / O.S. Basic Management - Word Processing / Word Processing - Spreadsheet / Spreadsheet - Databases / Structured Data Management - Multimedia Presentations / Slideshows - Internet & Networking.	7,0
Mod.09/ITS	Meccanica elementi di disegno tecnico e Sistemi CAD	30	20	Elements of applied mechanics - Materials - CAD systems - Elementary graphic representation - Theory of industrial mechanical design	3,8
Mod.10/ITS	Macchine e impianti elettrici	22	20	Sistemi elettrici – Trasformatori monofasi – Trasformatori trifasi – Macchina asincrona – Macchina sincrona – Macchina a corrente	3,0
Mod.11/ITS	Elettronica di potenza ed Azionamenti Elettrici	20	15	Codes and operations in binary - Combinational networks - LEDs and displays - PLC - Tristor converters	2,6
Mod.12/ITS	Comunicazioni elettriche, automazione, robotica, sistemi di	20	10	Codes and operation in binary - Combination networks - Led and Display - Memories - Programmable logic controllers	2,4
Mod.13/ITS	Meccanica della locomozione e la ferrovia dell'ambiente	10	10	Equilibrium in the system rotates away - The mechanics of traction - The railway market - Efficiency and environment - The demand - Objectives of effectiveness, efficiency and quality	1,4
Mod.14/ITS	Gestione della manutenzione ed affidabilità dei sistemi	20	0	Maintenance policies and strategy - Maintenance - Maintenance management system - Maintenance costs Information systems for maintenance	2,0
Mod.15/ITS	Normative e organizzazione ferroviaria	20	0	Normative basis of VIS (Independent Safety Assessors) / NoBo (Notified Bodies) activities and, in general, activities of the Odi (Inspection Bodies) and CBs (Certification Bodies) in the railway sector - National safety authorities: ANSF: Tasks and operation - Introduction to the EU legislation for railway safety and interoperability - Inspection / Certification Bodies: VIS, NoBo, SRM Certification Bodies - Regulatory basis and accreditation of the CBs and CEs: ISO / IEC 17020 and ISO / IEC 17065 - Subjects Maintenance Managers. Legislation (Reg. (EU) 445/2011) and certification - Structure and use of the Technical Specifications of Interoperability of the European Union - Introduction to the activities carried out by ISARail SpA as VIS / NoBo (methods of approach, documentation, organization, etc.) - Presentation of case studies relating to activities carried out as a VIS / NoBo / CB SRM (2/3 cases to be selected, relating to approvals, technical admissions, SRM certifications, etc....)	2,0
Mod.16/ITS	Aspetti giuridici e organizzativi dell'impresa	10	0	Notions of business economics - The Budget	1,0
Mod.17/ITS	Contrattualistica	10	0	The employment relationship: genesis and deepening of the employment relationship - The paycheck - Analysis and comparison of the national collective labor agreement: tourism and transport - The company: disciplinary code, operating regulations, staff	1,0
Mod.18/ITS	Gestione del prodotto ferroviario	20	0	Project setting - The train - Construction process - Industrial management	2,0
Mod.19/ITS	Fisica Tecnica (Fluidodinamica, Termodinamica e trasmissione del calore)	20	0	Thermodynamic systems - Direct gas cycles - Inverse cycles - Humid air - Heat transmission - The balance of fluids - The motion of fluids - Pumps and compressors	2,0
TOTALE		312	185		38,6

terzo semestre	ONI teorico-pratiche/MODULI ANSF			Contenuti	CFU equivalenti
Mod.20/ITS	Allineamento Formazione Ferroviaria	30		Characteristics of a railway vehicle, classification and typology of vehicles	3,0
MV00/ANSF	Modulo teorico di formazione generale	12		General knowledge of motorized and towed railway vehicles, illustration of the individual safety devices; information on the maintenance techniques of the safety devices. Risks associated with the maintenance activities of the safety organs of the rolling stock.	1,2
MV01/ANSF	Il sistema tecnologico di bordo e le attività di manutenzione connesse	32		On-board systems and related maintenance, knowledge relating to the function, types and types of intervention on the different technologies according to the different manufacturers; on-board equipment for the safety of the conduct of railway vehicles; system layout; carrying out software updates with special tools and maintenance tools.	3,2
MV02/ANSF	Il rodiggio e le attività di manutenzione connesse	32		Operating principle of the running gear of a railway vehicle, layout of the main components of the running gear and related functions; assembly and disassembly of the various components; knowledge and ability to measure wheels with the measuring tools in use.	3,2
MV03/ANSF	I carrelli e le attività di manutenzione connesse	32		Operating principle of the bogie of a railway vehicle and related regulations; arrangement of components and specific functions; methods and equipment for assembly and disassembly of the trolley and its components; know how to perform maintenance interventions as well as checks and adjustments.	3,2
MV04/ANSF	Gli organi di trazione e repulsione e le attività di manutenzione connesse	32		Il sistema di trazione e repulsione di un veicolo ferroviario e le norme che ne regolano la manutenzione e l'utilizzo; il layout e le tipologie dei singoli impianti con la collocazione e le funzionalità specifiche dei componenti.	3,2
MV05/ANSF	Il telaio - cassa e le attività di manutenzione connesse	24		The frame / crate / load-bearing structure system and related components; the components of the system, their function as well as their location and the relative maintenance interventions, the connection and disconnection methods of the safety devices applied to the cash desk.	2,4
MV06/ANSF	I circuiti elettrici e le attività di manutenzione connesse	32		Electrical and electronic systems (basic, power, signal) of a railway vehicle, the circuits, the function and the arrangement of the relative components; the grounding procedures of a railway vehicle; to be able to carry out maintenance operations according to the foreseen procedures.	3,2
MV07/ANSF	L'impianto pneumatico e il freno con le attività di manutenzione connesse	32		Operation of the pneumatic and brake system of a vehicle and the related rules for operation and operation; being able to identify the electrical, mechanical and pneumatic components of the system, their location and function; knowledge of safety rules during testing, maintenance of brake components, continuous brake operating principle and tacho signal interfaces.	3,2
MV08/ANSF	Le porte e le attività di manutenzione connesse	24		Notions on the operating principle of the door system of a railway vehicle and the different types of systems; the layout of the systems, the individual components, their location and function of the circuits; the levels and types of safety of the system and the interfaces of the tacho signals.	2,4
MV09/ANSF	L'impianto antincendio e le attività di manutenzione connesse	16		General operating principle of fire-fighting systems, use and maintenance rules; layout of systems, components and their location and specific functionality; levels and types of system safety, extinguishing systems in relation to the sectors affected by the vehicles.	1,6
TOTALE		298			29,8

quarto semestre	Stage				CFU
CODICE	INSERIRE CONTESTO OPERATIVO				30 equivalent credits for the internship part calculated conventionally