Training design for induction course for newly created Indian Railway Management Service

(presently catered by eight Group 'A' services)

Dissertation in

Partial fulfillment of the requirement of the degree of master of philosophy in social sciences and Master Diploma in public administration from Punjab university

by

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Under the guidance of

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48th Advance Professional Programme in Public Administration

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Indian Institute of Public Administration

Certificate

I have the pleasure to certify that Mr Ajay Kumar Jaiswal has pursued his research work on newly introduced service in Indian railway and prepared the present dissertation entitled "**Training design for induction course for newly created Indian railway management service (presently catered by eight Group 'A' services)"** under my guidance and supervision. The dissertation is the complete result of his own research; and to the best of my knowledge, no part of it had earlier comprised any other monograph, dissertation, or book. This is being submitted to the Punjab University, Chandigarh for the degree of Master of Philosophy in Social Sciences in partial fulfillment of the requirement for a Master's diploma in public administration under the Advanced Professional Programme in Public Administration(APPPA) of the Indian Institute of Public Administration(IIPA), New Delhi.

I recommend that the dissertation of Mr. Ajay Kumar Jaiswal is worthy of consideration for the award of the M. Phil degree of Punjab University, Chandigarh.

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New Delhi — Ajay Kumar Jaiswal

March 2023 — Roll no 4813

Declaration

I, the undersigned, with this declare that the dissertation titled '**Training design for induction course for newly created Indian Railway Management Service (presently catered by eight Group 'A' services)'** is my own work and that all the sources I have accessed or quoted have been indicated or acknowledged by means of completed references and bibliography. The dissertation has not been submitted for any other degree at this university or elsewhere.

New Delhi — Ajay Kumar Jaiswal

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List of Abbreviations

Abbreviation	Full Form
AC	Air Conditioning
A/c	Account
ACD	Anti Collision Device
AFP	Group ‘A’ Foundation Programme
ADRM	Additional Divisional Railway Manager
ADEN	Assistant Divisional Engineer
AI	Artificial Intelligence
AIMS	Accounting Information Management System
AIP	Group ‘A’ Induction Programme
AMP	Advanced Management Programme
ART	Accident Relief Train
ARME	Accident Relief Medical Equipment
ATD	Auto Tensioning Device
AWS	Auxiliary Warning System
BBQ	Basin Bridge Junction
BCT	Bombay Central Terminal
BIA	Bhilai
BLW	Bananas Locomotive Works
BOM	Bill Of Material
BPAC	Block Proving by Axle Counter
BPC	Brake Power Certificate
BTU	British Thermal Unit
CAG	Comptroller and Auditor General
CAT	Central Administrative Tribunal
CBE	Chief Bridge Engineer
CBI	Central Bureau of Investigation
CCB	Computerised Controlled Brake
CCRS	Chief Commissioner of Railway Safety
CD	Course Director
CDE	Chief Design Engineer

CE	Chief Engineer
CEE	Chief Electrical Engineer
CLW	Chittaranjan Locomotive Works
CME	Chief Mechanical Engineer
CNC	Computerised Numerical Control
COM	Chief Operating Manager
COP	Co-efficient Of Performance
COP	Contingency Operation Plan
CONCOR	Container Corporation of India Ltd
CPA	Kanpur Anwarganj station code
CPD	Chief Project Director
CPDE	Chief Planning and Design Engineer
CPR	Cardiopulmonary Resuscitation
CPR	Chhapra railway junction station code
CRS	Commissioner of Railway Safety
CRIS	Centre for Railway Information Systems
CSTE	Chief Signal and Telecom Engineer
CSTM	Chhatrapati Shivaji Maharaj Terminus
CTE	Chief Track Engineer
CTI	Centralized Training Institute
C&W	Carriage & Wagon
DAR	Discipline and Appeal Rules
DAIC	Dr. Ambedkar International Centre
DEMU	Diesel Electric Multiple Unit
DFCCIL	Dedicated Freight Corridor Corporation of India Ltd
DG	Director General
DMRC	Delhi Metro Rail Corporation
DMV	Dimapur, station code
DPRS	Distributed Power Rolling Stock
DPWCS	Distributive Power Wireless Control System
DRM	Divisional Railway Manager
Dy. CE	Deputy Chief Engineer
EIR	East Indian Railway

EMU	Electric Multiple Unit
ESCAP	Economic and Social Commission for Asia and the Pacific
ETCS	European Train Control System
ETP	Effluent Treatment Plant
FMS	Fuel Management System
FOIS	Freight Operations Information System
GDP	Gross Domestic Product
GeM	Government e-Marketplace
GHG	GreenHouse Gases
GM	General Manager
GR	General Rule
GRP	Government Railway Police
GTO	Gate Turn-off Thyristor
HAHW	Hot Axle box Hot Wheel
HHP	High Horse Power
HOER	Hours of Employment and Period of Rest Rules
HOG	Head On Generation
HQ	HeadQuarter
HSR	High Speed Rail
HWH	Howrah Station code
IAS	Indian Administrative Service
ICF	Integral Coach Factory
IGBC	Indian Green Building Council
IGBT	Insulated Gate Bipolar Transistors
IIT	Indian Institute of Technology
IIM	Indian Institute of Management
IOH	Intermediate Overhauling
IPS	Integrated Power Supply
IP	Internet Protocol
IPAS	Integrated Payroll & Accounting System
IR	Indian Railway
IRAB	Indian Railway Air Brake
IRCTC	Indian Railway Catering and Tourism Corporation

IRCON	Indian Railway Construction Company Limited
IRAS	Indian Railway Account Service
IREPS	Indian Railway E-Procurement System
IRFS	Indian Railway Finance Corporation
IRHS	Indian Railway Health Service
IRICEN	Indian Railway Institute of Civil Engineering
IRIDM	Indian Railway Institute Of Disaster Management
IRIEEN	Indian Railways Institute of Electrical Engineering
IRIFM	Indian Railways Institute of Financial Management
IRIMEE	Indian Railways Institute of Mechanical and Electrical Engineering
IRITM	Indian Railways Institute of Transport Management
IRISET	Indian Railways Institute of Signal Engineering and Telecommunication
IRMS	Indian Railway Management Service
IRPS	Indian Railway Personnel Service
IRPFS	Indian Railway Protection Force Service
IRPSM	Indian Railways Projects Sanctions & Management
IRSE	Indian Railway Service of Engineers
IRSEE	Indian Railway Service of Electrical Engineers
IRSME	Indian Railway Service of Mechanical Engineers
IRSS	Indian Railway Stores Service
IRSSE	Indian Railway Service of Signal Engineers
IRTS	Indian Railway Traffic Service
ISB	Indian Standard Bureau
ISDN	Integrated Service Digital Network
ISO	International Organization for Standardization
ISTM	Institute of Secretariat Training and Management
IT	Information Technology
JA	Junior Administrative
JE	Junior Engineer
J&K	Jammu & Kashmir
JTBS	Jansadharan Ticket Booking Scheme

LGD	Lallaguda station code
LHB	Linke Hofmann Busch
LLH	Liluah station code
MCBG	Micro Controller Based Governor
MCR	Mukundpur Railway station code
MDP	Management Development Programme
MEMU	Mainline Electric Multiple Unit
MIs	Maintenance Instructions
MM	Material Management
M&P	Machine & Plant
MR	Minister of Railway
MTP	Mettupalayam station code
MTR	Mass Transit Railway
MYS	Mysore station code
NADT	National Academy of Direct Taxes
NAIR	National Academy of Indian Railway
NDA	National Democratic Allaiance
NDLS	New Delhi station code
NDRF	National Disaster Response Force
NF	Northeast Frontier
NGO	Non Governmental Organisation
NHSRCL	National High-Speed Rail Corporation Limited
NIDM	National Institute of Disaster Management
NITIE	National Institute of Industrial Engineering
NJP	New Jalpaiguri station code
NKJ	New Katni Junction station code
NRM	National Rail Museum
NRTI	National Rail Transport Institute
NTDPC	National Transport Development Policy Committee
NZM	Hazrat Nizamuddin station code
ODC	Over Dimensional Consignment
OFC	Optical Fiber Communication
OHE	Over Head Equipment

OHSAS	Occupational Health and Safety Assessment Series
OR	Operating Ratio
OMRS	Online Monitoring of Rolling Stock System
PCE	Principal Chief Engineer
PERT	Programme Evaluation & Review Technique
PEI	Performance Efficiency Index
PFA	Principal Finance Adviser
PHOD	Principal Head of Department
PL	Price List
PLM	Product Lifecycle Management
PM	Prime Minister
PME	Periodical Medical Examination
PMS	Parcel Management System
PNM	Permanent Negotiating Machinery
POH	Periodic Overhauling
PRS	Passanger Reservation System
PSU	Public Sector Undertakings
PU	Production Unit
PWP	Preliminary Works Programme
RB	Railway Board
RCP	Residential Card Pass
RCF	Rail Coach Factory
RCT	Railway Claim Tribunal
RDSO	Research Design Standard Organisation
RE	Railway Electrification
RITES	Rail India Technical and Economic Service
RMS	Rake Management Service
RNCC	Rajendra Nagar Coaching Center
RPF	Railway Protection Force
RSP	Rolling Stock Program
RTF	Rail Test Facility
RWF	Rail Wheel Factory
SCADA	Supervisory Control and Data Acquisition

SCRA	Special Class Railway Apprentice
SDRF	State Disaster Response Force
SE	Section Engineer
SFC	Specific Fuel Consumption
SOD	Schedule of Dimensions
SOP	Schedule of Power
SPARROW	Smart Performance Appraisal Report Recording Online Window
SRC	Santragachi station code
SSE	Senior Section Engineer
S&T	Signal & Telecom
STBA	Station Ticket Booking Agent
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCAS	Train Collision Avoidance System
TIA	Travelling Inspector of station Account
TOR	Turn Over Ratio
TPC	Traction Power Controller
TPP	Toppur station code
TPWS	Train Protection and Warning System
TQI	Track Quality Index
TRC	Track Recording Car
TRD	Traction Distribution
TRO	Traction Rolling Operation
TRS	Traction Rolling Stock
UMB	Ambala Cantt station code
UNDP	United Nations Development Programme
UNESCO	United Nations Educational Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UTS	Unreserved Ticketing System
VHF	Very High Frequency
VLs	Vehicle Location service
WGR	Workshop General Register
WILD	Wheel Impact Load Detector
WMS	Workshop Manufacturing Suspense

ZRTI Zonal Railway Training Institute

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Summary

Indian Railway(IR) is one of the biggest organizations with employers managed by ten different group 'A' Services. Out of the ten different services, eight services are directly involved in the maintenance and operation of the railways whereas two services Indian Railway Health Service(IRHS) and Indian Railway Protection Force Service(IRPFS) are for the health services of employees and the safety of the railway assets. As part of its reform process, the National Democratic Alliance (NDA) government has taken a bold step of unification of eight different group 'A' services into one service i.e. Indian Railway Management Services which will cater to the services provided by Indian Railway Service for Engineers(IRSE), Indian Railway Service for Mechanical Engineering(IRSME), Indian Railway Service for Electrical Engineer(IRSEE), Indian Railway Service of Store(IRSS), Indian Railway Service for Signal & Telecom Engineer(IRSSE), Indian Railway Traffic Service(IRTS), Indian Railway Personel Service(IRPS), and Indian Railway Account Service(IRAS) to curb the departmental-ism. The aim of the unification of the services is to bring all the services on one platform without a departmental bias for the development of the railway. The government of India has unified all the eight different group 'A' services into one service based on the Bibek Debroy committee recommendation to curb departmentalism and better the development of the railways. All eight service probationary officers get trained in different institutes based on departmental requirements. After unification, all eight services into a new service i.e. Indian Railway Management Service(IRMS) are notified that recruitment will be done through the Civil Service examination by Union Public Service Commission(UPSC) in the coming year onwards. The training of the IRMS, accordingly, is needed to be designed in such a way so that they can cater to the services required by eight

services. The consolidation of the training is done which is usually imparted to all eight services by different Indian railway institutes.

In this context training needs of the IRMS, training content design, and making a detailed curriculum for the two-year probationary training is the main focus of the Research. The detailed training includes theoretical, practical, and project exposure in the field and foreign exposure for holistic development of the probationary officer to deliver the work as expected in Amritkal of Indian Independence in the next twenty-five years.

In line with the Literature review of the Bibek Debroy committee recommendation, Further, as per the Narien Gupta Committee recommendation and other literature on the subject, it has been observed that the departmental-ism hampered the efficiency of the Indian railway. With the unification of these eight services, the efficiency of the railway is expected to improve for development in the future.

Presently all eight different services are getting trained as per the respective Central Training Institute Plan broadly based on railway board guidelines. The new system will induce consolidation of the training requirements of the IRMS for all the Centralised Training Institutions (CTIs) with 78 Weeks plan.

In line with mission Karmyogi this document talks about the requirement of training in different areas of the technical and managerial skill set covering theoretical and practical aspects including field training, foreign training, and ongoing project execution training.

It also covers discussions with more than 100 railway officials belonging to training institutions, research institutions like RDSO, Railway Board, Division Zonal

headquarters, and production units. The training content for the IRMS has been designed for 104 weeks of training. The training content includes technical as well as managerial aspects. Operation and commercial part of train management directly impacts the passenger and freight operator is planned for training for more than four months in the detailed curriculum which includes the operation of the train, crew management, ticketing management, public interface services, catering, watering and train marshaling activities in the yard.

The training has been distributed into different institutions between 5 to 10 weeks in each institution apart from the National Academy of Indian Railway(NAIR) including theoretical and practical aspects of Civil, electrical, mechanical, signal, telecom, commercial, operating, store, personnel, and account department. The training at NAIR is planned for more than six months of technical and managerial training. The foundation course and Induction course are also part of NAIR training as it is usually conducted for eight different services but the Induction course duration has been reduced as the majority of the training is planned in different railway institutions. The Phase training of Civil, Mechanical, Electrical, Traffic, and Signal & Telecom (S&T) is planned for 10 weeks in each CTIs to impart all the technical and commercial training.

The content design covers modalities of field training at different railway institutions like Production Units(PUs), Public Sector Undertakings(PSU), Electric Shed, Diesel Shed, Workshop, Station, P. Way maintenance depots, Coaching depots, Electric Multiple Units(EMU)/Diesel Electric Multiple Units(DEMU) sheds, Zonal Railway HeadQuater(HQ), Divisions, and foreign visits related to bigger projects like bullet trains in India.

Therefore, a detailed training curriculum for IRMS probation is made based on the design contents of 104 weeks. Engineering is the backbone of Railway management. Indian Railway is one of the organizations which not only runs the trains but also manufactures and maintains the trains. Indian railway also builds all the fixed infrastructure including, track, Over Head Equipment(OHE), signaling system, station, and buildings. Under a single roof, the railway performs almost all kinds of engineering and management activities while delivering services to passenger and freight transportation.

The detailed time schedule includes three sessions of two hours each, every day and five days a week. The sessions are made to provide training in the basics of all the railway technology used in the first phase and advanced technology in the second phase of the curriculum. This includes the basics of mechanical, electrical, civil, signaling & telecom engineering to maintain the railway moving as well as fixed infrastructure like Electric locomotives, Diesel locomotives, coaches, wagons, train-sets, Over Head Equipment(OHE), track, signaling equipment, traction distribution sub-stations, railway station, and other passenger amenities.

The practical part of the training covers both phases so that theoretical training can be connected with the real feel of railway transportation activities. The training curriculum includes all the aspects of manufacturing, laying the tracks, and building other infrastructure like signaling, OHE, and other passenger amenities. Maintenance is the backbone of railway transportation which is included in the training curriculum. Every train needs maintenance on a schedule. Similarly, fixed infrastructure needs maintenance in a defined schedule so that train service can be continued. Indian Railway is having more than 12 lakh employees which are providing services in

different departments.HR issues are also included to effectively maintain personnel rules and regulations.

Ethics training of one week is also part of the detailed training curriculum to understand the ethical part of the duties while performing the service. A rural Visit for one week will provide the feel of the real Indian aspiration and need. The training for Parliament visits is part of the curriculum to understand parliamentary procedures and the responsibilities of members of parliament. Visit to Jammu & Kashmir(J&K) and Northeastern Frontier(NF) railway is also included in the training to understand the challenges and opportunities of railways for the future in the process of development during Amrit Kaal.

Finally, the detailed curriculum as designed and elaborated in the study for IRMS probationers training covers almost all the aspects of railway functioning and its future aspiration a developed nation, which is the target of the government in 2047.

Chapter 1

Introduction

1.1 Indian Railway

Indian Railway is the lifeline of the nation as it is stretched from South to North and East to west around 1.27 lakh track kilometers. The journey of the Indian railway started before 1853. Indian Railway is the biggest employer in the country which provide transportation services to every citizen of the country. It caters to around 8 billion passenger journeys in a year. Indian railway growth in the last 75 years is beyond the growth of the country's Gross Domestic Product(GDP).

The first railroad trip across the Indian subcontinent covered a distance of 21 miles between Bombay and Thane. Mr. George Clark, the Chief Engineer of the Bombay Government, initially had the idea of building a railway to link Bombay, or Mumbai, with Thane, Kalyan, and the Thal and Bhore Ghats inclines, when visiting Bhandup in 1843. The official opening took place on April 16, 1853, when 14 railway carriages leaving Bori Bunder at 3.30 p.m. "to the salute of 21 guns" and "amidst the loud applause of a great multitude" On August 15, 1854, the first passenger train travelled from Hathras Road to Mathura Cant, a distance of 24 miles, departing from Howrah station.As a result, the Eastern side of the subcontinent's railway transportation system officially began with the opening of the first segment of the East Indian Railway, now known as the Eastern Railway. The Madras Railway Company inaugurated the first line in the southern region of India on July 1, 1856. It began 63 miles away at Vyasarpadi Jeeva Nilayam (Veyasarpandy) and ended there at Walajah Road (Arcot). On March 3, 1859, a 119-mile line from Allahabad to Kanpur in the northern section

of India was constructed. On October 19, 1875, traffic was allowed to travel from Hathras Road to Mathura Cant.

These were the good beginnings that developed into a network of railway lines all over the country. By 1880 the Indian Railway had a route of about 9000 miles. Indian Railways, the

lifeline of the country is the largest rail network in Asia and the world's second-largest under single management with more than 12.5 lakhs employees.

Indian Railways spread its network across the country throughout 28 states and 8 Union Territories from Kanyakumari in the south to Jammu and Kashmir at Baramulla in the north, and from Gujarat in the west to Manipur, Assam, and Arunachal Pradesh in the east. Indian railways play a vital role in connecting the country by running more than 21000 trains daily including freight and passenger. The National carrier transports more than 8.4 billion passengers and more than 1.2 billion tonnes of freight in a year. It is the largest employer in the country having more than 12 lakhs employees. Indian Railways has already received revenue of more than 1.9 lakh crores in 2018-19.

Indian Railway has gone a long way from 1950-51 in all the areas of rail transportation including infrastructure like laying the track, electrification, advanced signaling system, self-reliance in manufacturing of rolling stocks, etc. The track running kilometer increased from 59315 to more than one lakh from 1951 to 2020. The number of passengers carrying rolling stocks has increased four times approximately from 20000 to 80000 along with more carrying capacity and passenger amenities with modern values. The freight revenue has increased 100-fold in terms of Rs which is much faster than the growth of the GDP of the country. Indian Railway

has set up eight factories to manufacture all kinds of rolling stocks, electric and diesel locomotives, and wheels, which is one of the best examples of Make in India. The Indian Railway has done exemplary work in the field of promoting tourism in the country by preserving a lot of heritage sites and running tourist-specific trains.

Indian Railways is a multi-gauge (Narrow, Metre, and Broad) system covering the following:

Table 1. Details about Track of the Indian Railways

Track Kilometres (2020-21)			
Broad Gauge (167 6 mm)	Metre Gauge (1000 mm)	Narrow (762/610 mm)	Total
122700	2189	1722	126611
Route Kilometres (2021-22)			
Electrified		Total	
50394		68043	

Other Interesting facts of Indian Railways runs around 21,000 trains everyday are:

Table 2. Details about the rolling stocks and fixed infrastructure

Locomotives	Coaching Stocks	Freight Wagons	Stations
12954	81835	302624	6853
Yard	Good Shed	Repair Shop	Emplyoyee
300	2300	700	12.54 lakhs

1.1.1 Territorial Zones Readjustment and In-House changes/Reforms:

Indian Railways has chosen to construct new zones by territoriality readjusting current zones in order to increase administrative efficiency, hasten the implementation of ongoing projects, provide world-class customer care, reduce the workload on General Managers (GMs), and other benefits. The new zones will be lean and effective, with a contemporary administrative structure and less financial strain on the railways.

1.1.2 National Rail Vikas Yojana

A non-budgetary investment for the development of Railways has been launched with the aim of completing strategically significant projects within a set amount of time. The capacity constraints in the crucial stretches of the railway network will be eliminated under this plan at a cost of Rs. 15,000 crore over the following five years. These initiatives would consist of

1. The golden quadrilateral needs to be strengthened so that long-distance mail, express, and freight trains can operate at a speed of 100 kmph.

2. The development of multi-modal corridors to the hinterland and the improvement of rail connectivity from roads and land to ports.

3. The building of four massive bridges: two across the Ganga, one across the Brahmaputra, and one across the Kosi River.

4. An expedited approach to the completion of other significant projects as well as those that are almost finished.

1.1.3 New Trends in Passenger Amenities:

A new pilot project on computer-based unreserved ticketing has been launched to handle the unreserved passenger sector. Computer-based ticketing systems have been introduced for all stations in Delhi and other metropolitan station regions, and eventually throughout the entire country, to serve this sizable demographic. With this, it will be possible to issue unreserved tickets from locations other than the boarding station, which will ease congestion at ticket counters and stations.

1.1.4 Indian Railway Catering and Tourism Corporation

With the help of the Centre for Railway Information Systems (CRIS), one of the biggest ticketing platforms in the world, irctc.co.in, has developed an online ticketing service that can be accessed there. To provide improved passenger information and enquiries, the "National Rail Inquiry System" has been launched. Via a variety of output devices, including terminals in station enquiries and Interactive Voice Response Systems (IVRS) at significant railway stations, this system delivers the train running status on an ongoing basis.

Freight Operations Information System (FOIS) Computerisation of freight operations by Railways has been achieved by implementing Rake Management System (RMS). Such FOIS terminals are available at the majority of the station. Railways have established their own intra-net ’Railnet’ It provides networking between Railway Board, Zonal Headquarters, Divisional headquarters, Production Units, Training Centers, etc.Sterling Performance by PSUs The public sector

undertakings of the Railways, especially Indian Railway Construction Company Limited(IRCON) and Rail India Technical and Economic Service(RITES), scored

commendable achievements during the last three years. Indian Railways Finance Corporation Limited(IRFC) secured an excellent rating for the fourth year in succession by the Department of Public enterprises on the basis of the performance targets. Besides, Standards and Poor's, the international credit rating agency, also reaffirmed the sovereign ratings to IRFC. The Corporation has been making profits and paying dividends.

1.1.5 Make in India:

Indian Railway Production units like Integral Coach Factory(ICF), Chennai, Bananas Locomotive Works(BLW), Varanasi, Modern Coach Factory(MCF), Raibarele, Chittaranjan Locomotive Works(CLW), Chitranjan, Rail Coach Factory(RCF), Kapoorthala, Rail Wheel Factory(RWF), Bangalore, Patiala Locomotive Works(PLW), Patiala, and Rail Wheel Plant(RWP), Bela are creating the history in making rail coaches, locos and wheels under make in India. The Integral Coach Factory (ICF) in Chennai has manufactured as many as 301 coaches in the month of February (2018-19), taking the total for this fiscal to 2,919. Interestingly, this puts the factory among the largest railcar builders in the world, beating top Chinese manufacturers who produce approximately 2,600 coaches a year. ICF has crossed the second time in the year(2019), and the factory has crossed the 300 coaches per month mark.

1.1.6 Atm- Nirbhar Bharat:

Indian Railways has taken a lot of initiative to become atm nirbhar by reducing the import dependencies in making rail cars and locomotives. At present more than 95% of the components of coaches and locomotives are manufactured in India. Vande Bharat express is a live example of atm-nirbharta in semi-high-speed rail technologies. The Vande Bharat express is completely designed by Indian Railway Engineers. Indian Railways has also upgraded most of the wagons to fit to run at 100 kmph through indigenous upgradation of its design.

1.1.7 Mission Gati Shakti:

he National Master Plan for Multi-modal Connectivity (PM Gati Shakti) is a digital platform that the Prime Minister (PM) launched to bring 16 Ministries, including those of Roadways and Railways, together for integrated planning and coordinated implementation of infrastructure connectivity projects. The movement of people, commodities, and services between modes of transportation will be integrated and frictionless thanks to the multi-modal connection. It will speed up last-mile infrastructure connectivity and shorten people's commutes. The Gati Shakti Directorate's creation has given project approval for the Railways more momentum. In 2022, 300 projects were approved, compared to 40 to 45 over the same time period in 2021.

1.1.8 Private Sector Participation:

The public and commercial sectors are now becoming more involved in building rail infrastructure. To offer wide gauge connectivity to Pipava Port, a joint venture firm was established with the Pipava Port authority. The Ministry of Railways and the State governments of Andhra Pradesh, Karnataka, Maharashtra, West Bengal, Tamil

Nadu, and Jharkhand have inked Memorandum of Understandings (MoUs) to build train infrastructure in these States.

1.1.9 Telecommunication - New Trends:

Optical fiber-based communication systems have been used to provide better rail communications, and this year, the amount of Open Fiber Communication (OFC) routes laid climbed to 7,700 route kilometres. Rail Tel Corporation was established to construct optical fibre cables beside railroad rails in order to develop a nationwide broadband multimedia network. The Indian Railway will receive enhanced operational and passenger facilities as well as increased revenue thanks to this technology.

1.1.10 New Technologies:

As the first such locomotive was flagged off from Chittaranjan Locomotive Works, India became the first developing nation and the fifth country in the world to roll out the first indigenously produced "state-of-the-art" high horsepower three-phase electric locomotive (CLW). A semi-high-speed train was introduced in India in 2018 and is now widely used around the country in Amrit Kaal. For the safety of the train while it is moving, India has created the Train Collision Avoidance System (TCAS) technology (anti-collision device). In a few years, the first high-speed trains in India will run between Mumbai and Ahmadabad. In order to allocate the passenger seat when making reservations, the Indian Railway system has already begun employing an artificial intelligence (AI) technology.

1.1.11 Honour and Awards:

Indian Railways has won numerous accolades and prizes in the fields of sports, tourism, and operational efficiency. The Railway team's outstanding athleticism in the 2018 Commonwealth Games was a major factor in the Indian team's record-breaking success. Railway players earned 10 gold medals out of the twenty-six gold medals. India's success in numerous team events was aided by the railways. Several athletes from Railways have received prestigious sporting honours like the Arjuna Awards.

The United Nations Educational, Scientific, and Cultural Organization designated Darjeeling Himalayan Railways as a World Heritage Site (UNESCO). In March 2000, the International Tourist Bureau in Berlin presented Fairy Queen, the oldest operating steam engine in the world and a holder of a record in the Guinness Book of World Records, with the Heritage Award. In terms of operations, Delhi Main Station holds the record for having the largest route relay interlocking system in the world.

Older citizens, students, people with disabilities, women, and other groups who require social assistance and care are given preferential treatment by the railways. The age limit for a special concession to senior women residents was lowered from 65 to 58 years old in recent years, and visually and mentally challenged people can now travel in air-conditioned (AC) classes at discounted rates.

Though the Indian Railway has done a lot of services in the last seven decades, there are still lots of gaps between the demand and supply. The expectation of the Indians to get faster trains, reservation on demand, faster freight services, etc are yet to be met. Indian Railways' financial health is not in very good shape. The expenditure on the employee salary and retired employee pension itself is more than

60% of the revenue receipt. The operating ratio is more than 95%, which is quite alarming from an organizational development point of view

1.2 Different recommendations regarding departmental-ism in Railway

Indian railways have ten departments to deliver the different services to external and internal customers and citizens of the country. The operation and commercial activities of the railways are looked after by the traffic department headed by Indian Railways Traffic Services. The Maintenance of the track and civil structures is done by the Engineering department headed by Indian Railway Service for Engineers. The manufacturing and maintenance of Rolling stocks i.e. passenger coaches, wagons, and diesel locomotives are done by the mechanical engineering department headed by Indian Railway services for Mechanical Engineers and Special Class Railway Apprentices(SCRA). The manufacturing & maintenance of Electric Locomotives, Electric Multiple Units(EMU), Traction Distribution(TRD), and general electrical services are done by the Electrical department headed by Indian Railway Services for Electrical Engineers. The complete installation and maintenance of the signaling system and telecom is done by the Signal and Telecom department headed by the Indian Railway service for Signal Engineers. The procurement of the material of all the departments is done by the Store department headed by Indian Railway Store services. The accounting and finance work is looked after by the accounting department headed by Indian Railway Account Service. To cater to the Human resource-related service there is a personnel department headed by Indian Railway Personnel Service. Indian Railway Health Services which looked after Medical services. The Security of the Railway infrastructure is looked after by Indian

Railways Protection Forces services. Apart from Health and security services all other eight services are directly or indirectly involved in transportation activities. These different services are specialized in nature based on their activities but there are certain activities that are similar in nature.

Several committees have been formed in the past after the liberalization policy of the Indian economy in 1991 for the mobilization of resources, restructuring of the railways, reform in the railways, etc. Several recommendations have been made based on the deficiencies and inefficiency of the railway services to not be able to deliver the services desired by citizens of the country. While analyzing the inefficiency of the railways working several committees have pointed out that railways functioning on a functional line leads to chronic disease i.e. departmental-ism. All the different departments are usually trying to pull the scarce resources to enlarge their area and their departmental development rather than organizational development. In 1994 Prakash Tandon Committee recommended merging eight organized Group 'A' services into one service and dividing the work of the railway on a business line rather than a functional line to end the departmental-ism in the railway so that organizational goal can be achieved and citizen expectations of increasing speed and passenger amenities can be met. On the departmental-ism there is an observation by the Gupta Narain Committee in 1996-

"The deep roots of "Departmental-ism" in IR, that is, excessive departmental consciousness, beyond what would legitimately be in order in a multi-disciplinary organization, lie not so much in the existence of different specialized functional services and discipline as in …..inadequate implementation from time to time of existing norms and policies;...Lack of transparency;...continued existence of serious

inequalities in inter-service norms & policies themselves and…Short term of decision-making levels leading to initiatives in improvements not getting the adequate follow-up action"

There are other two observations in the National Transport Development Policy Committee (NTDPC)-Railway report at page no 62 and 63 respectively are-

"The current structure encourages excessive departmental-ism at the management level and often being priorities being set not for the organization as a whole, but on departmental consideration"

"Rail transport has two characteristics: a severely guided mode, and with controlled access. This in turn makes multidisciplinary inputs a must for its output….This is the root cause of the 'departmentalism' in the IR at the management level."

The latest committee on the Mobilization of resources for major railway projects and restructuring of railway ministry and railway board under the chairmanship of National Institution for Transforming India(NITI) aayog member Mr. Bebek Debroy in June 2015, who has also observed that (a) Lack of transparent and fair policies, especially in regards to manning of plum general management positions; (b) Competition among the departments in the allocation of resources and investment decisions; © Sub-optimal decision making. Such instances and behavior reinforce the 'Departmental' feelings and strengthen the vicious cycle. To curb the departmentalism in IR, the Central Government issued an order on 9th February 2022, announcing the unification of eight existing services of Indian Railways under one banner of IRMS - Indian Railways Management Service. The unification of eight existing services under the Ministry of Railways is being done to end 'departmentalism' in railways. According to the official gazette notification, a total of

eight existing Services of the national transporter Indian Railways is being combined to create the IRMS. These include the Indian Railway Service of Engineers (IRSE), Indian Railway Service of Mechanical Engineers (IRSME), Indian Railway Service of Electrical Engineers (IRSEE) Indian Railway Stores Service (IRSS), Indian Railway Service of Signal Engineers (IRSSE), Indian Railway Traffic Service (IRTS), Indian Railway Personnel Service (IRPS) and Indian Railway Accounts Services (IRAS).

1.3 Statement of Problem

Indian railways' different departments working, needs different technical and managerial skill sets. To inculcate these skill sets required training and experience. Presently all eight departments have different institutes for training at different places in India to inculcate different skill sets. There is a National Academy of Indian Railway (NAIR) at Vadodara which provides common training i.e. the Foundation course and Induction course to all the eight services probationary officers of Indian Railways. NAIR also provides training to IRSS and IRPS probationary officers apart from common training. Indian Railway Institute for Mechanical and Electrical Engineers (IRIMEE), Jamalpur, provides training to IRSME probationary officers. Indian Railway Institute for Electrical Engineers (IRIEEN), Nasik, provides training to IRSEE probationary officers.Indian Railway Institute of Signal Engineering and Telecommunication (IRISET), Sicunderabad provides training to IRSEE probationary officers. Indian Railway Institute of Civil Engineers (IRICEN) provides training to IRSE probationary officers. Indian Railway Institute of Transport Management (IRITM) provides training to IRTS probationary officers. Indian Railway Institute for Finance Management (IRIFM), Sicunderabad, provides training to IRAS probationary officers.

Each department made a different curriculum for training to impart the services in the respective department. There are many common subjects that are required in every department like the execution of tender/contracts, procurement, industrial relations, etc. At the same time, there is technical domain knowledge that is different for different departments. In this current scenario, there is no defined curriculum for IRMS officers who are going to be selected in 2023 for induction in the Indian railway as probationary officers. To define and describe the needed comprehensive curriculum of training during the probationary period of IRMS officers to provide a holistic knowledge of railways' technical and management functions to nurture them as future leaders of Indian Railways.

1.4 Objective

The Indian Railway Management Service has introduced subsuming all eight group 'A' services of Indian Railways to do away with departmentalism and make the organization more efficient based on management techniques. The probationary period of the IRMS officer is of two years. While designing and describing the training curriculum following objectives need to be addressed for IRMS officers-

- Study the eight different modules currently covered under induction courses for respective services.
- Identify training needs to be consolidated for IRMS.
- Develop course design covering objectives, methodology, content, and field visits.
- Prepare a two-year module preparation of an induction course for IRMS.

These four objectives need to be attained while designing the training of the Indian Railway Management services officer So that the officer should have the feel of understanding of the working of the railway to take it to a greater height. The present curriculum for existing group 'A' officers have been studied along with feedback from serving officers in Indian Railways to draft a complete curriculum of Indian railways management services.

1.5 Research Strategy and Research Design

The mixed strategy is adopted and used to design the comprehensive curriculum of the training for IRMS officers to attain the three objectives of the training. The discussion from the focus group i.e. mixed of all eight services officers is being done. Some of the case studies of rail transport management regarding the training of the technical and managerial executive are also taken into account while designing the curriculum of the training. The Research design will be used as an exploratory type.

1.6 Rational

IRMS is created to do away with departmentalism and silos by unifying eight group 'A' Services. It also calls for an induction course to suitably build the capacity of IRMS officers.

1.7 Research Question

Presently the training of different services is being conducted in seven different railway institutions at different places in India. These institutions are specialized training centers based on a different set of requirements. These institutions are also having some shadow of departmentalism. The IRMS is similar to the Indian

Administrative Services(IAS) and looks after all kinds of services in the district. IRMS will manage and deliver all kinds of services to the expectation of citizens in railways. While designing the curriculum the following question is examined -

- How to consolidate eight modules for different services into one?
- What is the current focus of training design, particularly in line with the mission Karmyogi covering Rule-based to Role based, capacity building, and behavioral training?
- What should be the current focus on managerial skills suitable for IRMS and technical training to be imparted in civil, mechanical, electrical, signal, and telecom?
- What type of field visits would be required to meet managerial and technical as may be required?
- What are the inter-country projects for initial experience in rail technology?
- How to schedule field visits in line with theoretical components?

1.8 Literature Review

Table 3. Review of Bebek Debroy committee report on railway

Year	2015
Author	Debroy,Bebek(2015),Chandrashekher,K.M.(2015),Das,Gurucharan(2015) ‘,Narain,Ravi(2015),Mukhopadhyay,Partha(2015),Kashyap,Rajendra(2015),Tyagi,Ajay(2015),Jha,Ajay Narayan(2015).’The report of the committee for Mobilization of resources for major railway projects and restructuring of railway ministry and railway board’. Available

	at:https://indianrailways.gov.in/railwayboard/uploads/directorate/HLSRC/FINAL_FILE_Final.pdf
Objective and issue discussed	The objective of the committee to study and recommend the reforms required in Indian Railways to mobilize the resources and restructuring the railway ministry and railway board to cater the gap between supply and demand of the country.
Research method	Mixed research methodology using exploratory, descriptive, and explanatory design.
Finding	The committee has come out with the following findings- 1. Slow decision-making due to centralizing power. 2. The IR account practices are not in the same band of commercial accounting followed by most other railway systems and need reform. 3. Over the years the Indian Railways become overly centralized and hierarchical which leads to a crucial issue i.e. departmentalism, affecting the working of the organization. Merging the different services is necessary. 4. Financial relation between IR and GOI. It has to be reviewed. 5. There is no independent regulator, needs to be made an

	independent regulator.
Research Gap	The report recommended how to make common seniority after merging eight different organized groups A services but it does not talk about how to handle court cases because every eight services are different.

Table 4. Review of Sam Pitroda committee report on railway

Year	2012
Author	Pitroda,Sam(2012),Parekh,Deepak(2012),Verma,M.S.(2012),Raghuram,G.(2012),Lall,Rajiv(2012),Chaterjee,Vinayak(2012),Jain,Ranjan(2012).'Report of the expert group for modernization of Indian Railways. Available at: https://indianrailways.gov.in/railwayboard/uploads/directorate/infra/downloads/Main_Report_Vol_I.pdf

Objective and issue discussed	To study and evaluate options and make key necessary recommendations for modernization of the ministry of the railway. The country suffers from severe and chronic under-investment in railway infrastructure. The resultant disproportionate diversion of freight and passenger traffic to roads ultimately leads to higher freight costs to GDP in comparison to other countries.
Research method	The Quantitative research methodology is used. An exploratory design is used.
Finding	The committee has come out with the following findings- 1. Upgradation of tracks and bridges is extremely important to increase the speed of the trains. 2. The Indian railway needs to invest in higher capacity rolling stocks and other infrastructure related to it. 3. Different freight corridors and passenger corridors is the needs of the hours. 4. All passenger crossing needs to be removed from safety as well as speed point of view.
Research Gap	The report does not talk in detail about the hierarchical inefficient working.

Table 5. Review of Paper by J.T. Vergese

Year	1998
Author	Verghese, J.T. Source: Current Science, 25 October 1998, Vol. 75, No. 8 (25 October 1998), pp. 818-823 Published by: Current Science Association Stable URL: http://www.jstor.com/stable/24101630
Objective and issue discussed	To study the perspective in improving the railway management. To study and do an analysis of the measure taken internally to improve Indian railways management in relation to its strength and weakness. To study to highlight the areas where attention was required in the context of Parkas Tandon committee Report.
Research method	The Quantitative research methodology is used. An exploratory design is used.
Finding	1. The better fuel efficiency, reduced land use for the same volume and reduced levels of accidents are well known. The inability of the railway organization to convert its fundamental advantages into a competitive edge. 2. Indian Railways would need to find ways to work in partnerships with private enterprises to run operations to cater to the gap between

	demand and supply in quantity as well as the quality of the services. 3. There are several training programs for training were launched at different management levels to improve management skills as reform in management was required. 4. Prakash Tandon committee reports recommended unified service to make railway working efficient.
Research Gap	The article does not emphasize how staff rightsizing can be done to provide cost-effective services in comparison to the road transportation sector.

Table 6. Details of notification of IRMS by Railway Board

Year	2022
Author	Board, Railway(2022) , Railway board letter no. 2020/E(GR)I/16/1(eo-3309650), dated 09.02.2022
Objective and issue discussed	Notification for Indian Railway Management services were issued after unifying the eight group A services with the objective to transform the railway management altogether.

1.9 Research Method to be applied and data sources

The methodology used for this study is based on quantitative as well as qualitative data. The data has been collected from secondary sources like Railway Board, NAIR, IRITM, IRIMEE, IRIEEN, IRICEN, IRISET, etc and the different stakeholders and around hundred officers are being interviewed in RDSO, Railway Board, Zones, and some divisions of the railway.

1.10 Scope/Limitation

The topic of the research itself is on designing the training needed for Indian Railway Management Services during the probation period so that they can cater all kinds of services which are catered by all eight different services to the expectation of citizens and internal customers. The research work is only limited to probationary officer training.

Chapter 2

Training curriculum of different Group ‘A’ Services at Different Railways Institutes

This chapter is having the railway board training direction of different services during probation, and training curriculum/plan of different services in different institutes. These curriculum details of different institutes provide the distribution of the number of sessions of different technical, managerial and field training. These details will help in the consolidation of the training require for IRMS probationers.

2.1 Probation:

The probationary training of probationers of different Group 'A' services has been centralized with the Centralized Training Institutions as prescribed by Railway Board are:

Service	Institution for Centrally Co-coordinating/ Monitoring Probationary training
IRSE	IRICEN, Pune
IRSME (Engg. Graduates and SCRA)	IRIMEE, Jamalpur
IRSEE	IRIEEN, Nasik
IRSSE	IRISET,Secunderabad
IRSS	NAIR, Vadodara
IRTS	IRITM , Lucknow

IRAS IRIFM, Secunderabad

IRPS NAIR, Vadodara

RPF Jagjivan Ram RPF Academy, Lucknow

The Ministry of Railways have decided vide letter No. E(Trg)89/13/3 , dated 15.09.1992 to revise the probationary training of probationers of Group "A'' services of all departments except IRAS, Railway Protection Force(RPF), and Medical, from 104 weeks to 78 weeks. The above will not be applicable to Group `A. Probationers of RPF, Indian Railway Medical Service,i.e. Indian Railway Health Services (IRHS) and Indian Railway Accounts Service(IRAS). For IRAS probationers recruited through CSE 1992 and onward, instructions were issued vide letter No. E(Trg)/92(20)2/IRAS dated 05.11.96 will be applicable. The period of probation, probation on training against working post would be as under:-

Service	Probation on Training	Probation against Working Post	Total period of Training
IRSME	1.5 years	1.5 years	3 years
IRSE	1.5 years	1.5 years	3 years
IRSSE	1.5 years	1.5 years	3 years
IRSEE,	1.5 years	1.5 years	3 years
IRSS	1.5 years	1.5 years	3 years

IRTS	1.5 years	1.5 years	3 years
IRPS	1.5 years	0.5 years	2 years
IRAS	1.5 years	0.5 years	2 years

2.1.1 78 Weeks Training Plan Of Probationer

As Per letter no-2018/E/(Trg)/40/8, 78 Weeks training plan from the railway board are distributed for probationer training in different institute for all different services of the railway. The detail of the duration distribution is following -

Table7. 78 weeks Course content distribution of railway services

Institute	Course	Services								
		IRAS	IRPS	IRSS	IRTS	IRSME	IRSE	IRSSE	IRSEE	IRPF
		In Weeks								
NAIR	Foundation	10	10	10	10	10	10	10	10	10
	Personality Development + Competency Assessment	1	1	1	1	1	1	1	1	1
	Induction Course	4	4	4	4	4	4	4	4	4
	Foreign Training	1	1	1	1	1	1	1	1	1

	National Institute of Finance Manangement(NIFM) Indian Institute of Management(/IIM)-Finance for non-finance	0	1	1	0	1	1	1	1	1
IRICEN	Ethics at Panchgini	1	1	1	1	1	1	1	1	1
	Appreciation + Works Programme	2	2	2	2	2	0	2	2	2
IRISET	Appreciation + Information Technology(IT) based courses	2	2	2	2	2	2	0	2	2
IRIEEN	Appreciation + Green and Clean Energy	2	2	2	2	2	2	2	0	2
IRIMEE	Appreciation + Enhm and Yoga	2	2	2	2	0	2	2	2	2
IRITM	Appreciation + Forest Academy and Research Institute	2	2	2	0	2	2	2	2	2
By	Joining	1	1	1	1	1	1	1	1	1

Respective CTI	J&K and NF training	2	2	2	2	2	2	2	2	2
	President/Parliament/ Railway Board	2	2	2	2	2	2	2	2	2
	Rural attachment	1	1	1	1	1	1	1	1	1
By Respective CTI(CTI specific training)	Phase	8	8	8	8	8	8	10	8	
	Specialized Management Training or Professional Training	10	8	8	8	8	8	4	8	
	PU	2	2	4	1	5	1	1	3	
	PSU	2	2	2	1	1	1	2	2	
	HQ	2	2	2	2	2	1	4	2	
	Division	2	4	2	2	2	1	4	3	
	On Job Training	8	8	8	8	8	8	8	8	
	Exam & Relieving	3	2	3	3	2	3	3	4	
By Respective CTI(CTI specific	CTI Suggested Training	8-Phase 2,Special	8-IPAS,Process	7-Special module,	14-Phase II &III,	10-Phase II,RDS	15-Field trainin	10-Phase II,Metro,	8-RDSO, RE. Loc	

)		module etc	innovation,Special module etc	Depot,RDSO etc	Other institutes etc	O,Workshop etc	g,Construction,RDSOIRITMTC, etc	NHSRCL etc	oPOH,EMU,Metro, ISB/IIM etc	
	Grand Total	78	78	78	78	78	78	78	78	

2.2 National Academy of Indian Railway(NAIR)

Fig 1. National Academy of Indian Railways, Vadodara, Gujarat

National Academy of Indian Railways (NAIR)— Earlier named as Railway Staff College, originally started in the year 1925 as a Transportation School, is the top most training institute of Indian Railways (IR). The Academy has been operating from the Pratap Vilas Palace situated in Vadodara city, the cultural capital of Gujarat, since 31 Jan1952. The excellent campus of the Academy is Indian Green Building Concept(IGBC) certified as well as ISO 9001:2015, ISO 14001:2015 and Occupational Health and Safety Assessment Series(OHSAS) 18001:2007 certified. The campus is spread over 43.5 acres (approx.) of green forest and lawns.

Each year, the Academy trains Probationary Officers of all the nine organized group 'A' services of Indian Railways. Besides, different Management, Capacity building and different functional programme are organized to train Railway officers in different stages of their careers while in service. The Academy also organises customized training programme for non-Railway personnel like Executives of Public Sector Undertakings, Foreign Nationals and Private organizations.

The major training programme being undertaken at the Academy are

- Foundation programme for all Probationary officers of Group-A Railway services.
- Induction programme for all Probationary officers of Group-A Railway services.
- Centralized training to all Probationary officers of Group-A Indian Railway Personnel, Stores and Health Services.
- Foundation Programme for all Group-B Officers of different Railway departments.
- Induction Programme for all Group-B Officers of Stores and Personnel departments of Indian Railways.

- Training under ‘Strategic Leadership, Management and Strategic Action Leadership Programme.
- Advanced Management Programme (AMP) for senior-administrative-level in-service Railway officers.
- Management Development Programme (MDP) for mid-level(JA and above) in-service Railway officers.
- Functional courses specific to various departments of Indian Railways.
- Training of Trainers.
- Training programme for foreign nationals under various schemes/tie-ups.
- Training programme for Non-Railway organizations.
- Special Courses.
- Seminars, Conferences, Workshops and Webinars.

The Academy delivers training in Classroom and Online modes, which is coordinated by a team of well-qualified Members, who are Indian Railways’ officers posted under various heads at the Academy. Moreover, the Academy also has a repository of Visiting or guest

Lecturers who are Industry experienced persons, Academicians and senior functionaries of Indian Railways and related industries.

2.2.1 Foundation Programme for Eight organized Group ‘A’ Services

Foundation Programme for all eight organized group ‘A’ services which all merged into one service i.e. IRMS are carried out at NAIR. The detailed programme for 10 weeks (300 hr) is-

Table 8. The detailed curriculum of the present Foundation course

S.No.	No. of Hours(Hrs	Topic of the session
1	2	Introduction
2	2	Inaugural Function
3	2	Campus Tour and Ice braking preparation
4	2	valedictory function
5	2	Relieving Formalities
	Familiarization with Indian Railways	
6	2	Romance of Indian Railways
7	2	History & Organization of Indian Railways
8	2	Etiquette
	Civil Engineering	
9	2	Role of civil engineering, Gradients, Curvatures and Turnouts
10	2	Level crossing. Points & Crossing and Patrolling
11	2	Schedule Of Dimensions(SOD) and Over Dimension-ed Consignment(ODC)
12	2	Commissioner of Railway Safety(CRS) Sanction and Project Management
13	2	Civil Engineering Field Visit to station yard
	Mechanical Engineering	
14	2	Locomotive, Running & Disaster Management
15	2	Coach
16	2	Wagons
17	2	Distributed Power Rolling Stocks
18	2	Workshop
19	2	Field Visit to Workshop

	Electrical Engineering	
20	2	Introduction and Function of Electrical department
21	2	General Services, Train lighting and Air Conditioning
22	2	Traction Rolling Stock
23	2	Traction Distribution
24	2	Traction Operation & Safety
25	2	Distributed Traction
26	2	Field Visit to loco shed
	S & T Engineering	
27	2	Organization of S&T department, design principles of the signaling system. history of railway signaling, the requirement of signaling on the railway, a basic concept-aspect & indication of signal, types of signal and their aspect & indication, stop & permissive signal.
28	2	Subsidiary signals, shunt & calling in signals, repeating signals, detonators, block section, line clear, authority to proceed, adequate distance/overlap, fouling mark
29	2	Points facing trailing points, point operation, sighting boards, stations type A, B, C & D in detail, isolation
30	2	Quiz, automatic signaling, signal operation, power supply arrangements, Integrated Power Supply(IPS), interlocking concepts, track circuits, block instruments
31	2	Field visit to Vishwamitri & Pratap nagar railway stations, working of all signaling gears at station and operation panels
32	2	Model room-demo of block instruments, track circuits, points panel interlocking, running of trains on signals & automatic signals
	Stores	
33	2	Role of Material Management (MM)
34	2	Provision & Recoupment 1
35	2	Provision & Recoupment 2

36	2	Indents & Tendering
37	2	Imports
38	2	Returned Store
	Operating	
39	2	Organization structure & Functions of the operating department
40	2	Coaching train operation
41	2	Freight train operation
42	2	Control Office Working
43	2	Line capacity, throughput & IT applications in operation
44	2	Field visit to Control office
	Commercial	
45	2	Overview of commercial functions & organization structure
46	2	Overview of freight, passenger & parcel business
47	2	Freight business-Commercial activities
48	2	Passenger business- Commercial activities
49	2	Parcel business & other commercial processes
50	2	Commercial Field visit to booking, parcel & reservation office
	Safety	
51	2	General Rule(GR) & Working of Signal-1
52	2	General Rule(GR) & Working of Signal-2
53	2	Safety Model Room 1(Practical aspect of signals)
54	2	Safety Model Room 2(training working)
55	2	GR Rules essentials of absolute block system
56	2	GR Rules essentials of automatic block system
57	2	Unusual Occurrences

58	2	Safety Model Room 3(unusual occurrences)
59	2	Rules applying to railway servants generally
60	2	Safety field visit to station
	Accounts	
61	2	Introduction & function of account department
62	2	General Manager(GM) Schedule Of Power(SOP) & Canons of financial propriety
63	2	Introduction of Railway account and classification of earning & expenses -1
64	2	Introduction of Railway account and classification of earning & expenses -2
65	2	Bill passing, imprest, account & audit inspection
66	2	Budget
	Personnel	
67	2	Organization structure of personnel department
68	2	Leave Rules
69	2	Pass Rules
70	2	Pay/Allowance & staff welfare
71	2	Hour of Employment and Period of Rest(HOER) Rules
72	2	Seniority, Transfer, Recruitment & Promotion
73	2	Service conditions
74	2	Conduct Rules
	Medical	
75	2	Medical attendance & treatment rules
76	2	Periodic Medical Examination(PME) & Medical board
77	2	Medical Certification & medical treatment
78	2	First Aid
	Law	

79	2	Factories act & Industrial dispute act
80	2	Workmen compensation act and payment of wages act
81	2	Contract act and arbitration
82	2	Basics of law and railway security
83	2	Railway act 1989 and RP(OU) act 1966
84	2	Right To Information(RTI) act 2005 and Consumer Protection Act(CPA) 1986
	Rajbhasha	
85	2	राजभाषा नीति एवं सांविधानिक उपबंध राजभाषा नीति संबंधी राष्ट्रपति के आदेश, विभिन्न राजभाषा कार्यान्वयन समितियां एवं उनके कार्य।
86	2	राजभाषा अधिनियम 1963, राजभाषा नियम 1976 तथा राजभाषा वार्षिक कार्यक्रम। सरकारी कामकाज मूलरूप से हिंदी में करने पर मिलने वाले नकद पुरस्कार और प्रोत्साहन।
87	2	कंप्यूटरों का द्विवभाषीकरण ताथा हिंदी में कार्य करने के लिए उपलब्ध टाइपिंग ई टुल्स। हिंदीतरभाषी अधिकारियों, प्रोबेशनरों के लिए हिंदी भाषा प्रशिक्षण हेतु संपर्कसत्र एवं विचार विमर्श।
	General Management	
88	2	Legal issues and Gender issues
89	2	Ethics and effective leadership in governance
90	2	Management Game
91	2	Presentation skill

92	2	Report writing
93	2	Use of Information Technology(IT) in railways
94	2	Team building and organisational leadership
95	2	Negotiation & conflict resolution
96	2	Latest development in Indian Railways
97	2	High speed railways
	Activities	
98	2	Exams 1(three subjects)
99	2	Exams 2(three subjects)
100	2	Exams 3(three subjects)
101	2	Exams 4(three subjects)
102	4	Exam 5(Safety viva voce) in model room
103	4	Supplementary exams
104	6	Bharat Darshan Tour 1
105	6	Bharat Darshan Tour 2
106	6	Bharat Darshan Tour 3
107	6	Bharat Darshan Tour 4
108	6	Bharat Darshan Tour 5
109	6	Book review(preliminary & final)
110	4	Quiz(preliminary & final)
111	4	Debate(preliminary & final)
112	4	Tour presentation
113	2	Course Director(CD) review and counseling-1
114	2	Course Director(CD) review and counseling-2
115	2	Course Director(CD) review and counseling-3
116	2	Course Director(CD) review and counseling-4
	Other Sessions	

117	2	Cultural program preparation
118	2	Foundation day
119	12	Public holiday
120	10	Voluntary leaves(VLs)
121	2	Shramdan
Total 316 Hrs		

2.2.2 Induction Programme for Eight organized Group 'A' Services

Induction Programme for all eight organized group 'A' services which all merged into one service i.e. IRMS are carried out at NAIR. The detailed program 4 weeks (135 hr) are-

Table 9. The detailed curriculum of the present Induction course

S.No	Module	No. of Hr	Topic
1	General	2	Introduction/Inauguration/Online Registration
		2	Valedictory
		2	Exam- Safety/Personnel/Accounts
		2	Registration
		4	Debate
		2	Group discussion
		4	My story

		2	CD Review
		2	Relieving Formalities
2	Law	2	Protection of child rights and related law
		2	Court, litigation and Right To Information(RTI)
3	Elect. Engg.	2	Renewable energy and Green House Gases(GHG)
4	Mech. Engg.	2	Quality Overview and Lean Management
		2	M & P Programme
5	Managerial Skill	2	Leadership
		2	Time Management
		2	Decision Making
		2	Status of Indian Railway in global scenario
		2	Crisis Management
		2	Role of Assistant Officer
		2	Innovation
		4	Group Behaviour
6	Personnel Mgt.	2	DAR

		2	Reservation Policy/NPS
		2	Selection/Promotion/Trade Test
		2	Industrial Relation
		2	Office Procedure, File Maintenance, Notings, Correspondence
		2	Performance Appraisal and SPARROW
		2	Conduct Rule
		2	Use of IT/Personnel and Account-IPAS
		2	Mock PNM
7	Safety	2	Accident Site Management
		2	Conducting accident enquiry and follow up
		2	Unusual Working
		2	Disaster Management
		2	Model Room
		4	Mock Drill
8	Customer Care	2	Latest initiative & future road map of Indian railways for customer care and amenities
9	Store	2	E-Tendering & GEM

		2	Procurement of Stock and Non-Stock item
		2	Supply Chain Management
10	Tender & Contract	2	Tender & Contract-Dos and Don’ts
		2	Works Programme
11	Transport Management	2	Operation Maintenance/Maintenance Blocks
12	Financial Management	2	Estimates & Costing
		2	Expenditure Control
		2	IR Budget & Financial Performance
		2	Performance and Financial Statistics
		2	Stock Verification
13	Health Management	2	Health and Stress Management
		2	Medical Reimbursement and facilities
14	Vigilance	2	Vigilance-Dos and Don’ts
15	IT	2	E-Office
		2	Emerging Technologies & IR
16	Miscellaneous	2	Rajbhasha

		2	Ethics
		2	Achievers' series
		6	Community Visit/Non-Governmental Organisation(NGO)
Grand Total(Hrs)/(Weeks)		134/ 4 Weeks	

2.3 Indian Railway Institute for Mechanical and Electrical Engineering(IRIMEE)

Fig 2. Indian Institute of Mechanical and Electrical Engineering, Jamalpur, Bihar

The oldest CTI of Indian Railways is the Indian Railways Institute of Mechanical and Electrical Engineering (IRIMEE). It was initially established by the East India Railway in 1888 as the Technical School of the Railway Locomotive Factory, Jamalpur (EIR). On August 15, 1854, the first full train of Trains was signalled off from Howrah to Hooghly, a distance of 24 miles. In 1861, the railway to Jamalpur expanded incredibly quickly. Munger, a manufacturing centre once known as the "Birmingham of the East," located close to Jamalpur. Jamalpur was initially only used as a steam locomotive change station, with minor repairs being made to the locomotives in the running shed. Howrah served as the site of EIR's first locomotive workshop. It was shifted to Jamalpur on 8th February 1862.

The Public Service Commission held selections for the prestigious Special Class Railway Apprenticeship(SCRA) Plan in 1926, and the first group of these apprentices enrolled in the Technical School on February 14, 1927. Eastern Railway ceded administrative responsibility of the Technical School to the Railway Board on April 1, 1974. The Indian Railways Institute of Mechanical and Electrical Engineering was then given the new name for the Technical School (IRIMEE). Since 1991, IRIMEE, Jamalpur, has served as the central location for IRSME Probationers' training.

IRIMEE is the CTI for all the IRSME officers including probationers and coordinates its 78 weeks of training while on Probation. Apart from Probationers training it also provides training to group ‘B’ Mechanical officers, Higher officials in different subjects of rolling stocks maintenance and manufacturing, Supervisors training in various areas of maintenance of coaches, wagons, and Enhm, etc.

2.3.1 **IRSME Probationer Training Plan**

IRIMEE has made 78-week training plan for IRSME probationers based on the railway board plan which is following-

Table 10. Training Plan of IRSME

Unit	Course	No of Weeks
Other than Mechanical Units	Group 'A' Foundation Program(AFP): Foundation Course at NAIR	10
	Group 'A' Induction Program (AIP): Induction Course at NAIR	4
	Common CTI training, one week in each at IRIEEN, IRISET, IRICEN, IRITM, IRIFM and NAIR(Personality Development)	7
	Railway Board + Parliamentary Training	1
	Indian Railway Institute Of Disaster Management (IRIDM)/Hijjala	1
Other than Railway Units	Audience with Hon'ble President of India	1
	Rural Training by IRIMEE	1
	Ethics in Governance at Panchgani	1
	Foreign Training	1
	Training at National Institute for Training in Industrial	4

	Engineering(NITIE)/Indian Institute of Technology(IIT)/Indian Institute of Management (IIMs)	
IRIMEE	Joining Formalities	1
	C & W Module	4
	Diesel Module	4
	Computer application and digital system	1
	Mechanical specific material planning	1
IRIMEE	Engg.Material & Quality Practice in Mechanical	1
	Money value cases in Mechanical Department	1
	Workshop Management	1
	Disaster Management	1
	Project Review	1
	Final Examination Paper 1 and Paper 2	1
	Director Assessment and Passing Out	1
External Mechanical Unit	Banaras Locomotive Works(BLW), Rail Wheel Factory(RWF) and Research Design and Standards Organisation(RDSO)(one week each)	3
	Integral Coach Factory(ICF), Rail Coach Factory(RCF)	6

	and Modern Coach Factory(MCF)(two weeks each)	
SST: Service Specific Training	Training at Jamalpur Workshop, one week in each for Wagon Shop, Diesel Periodic Overhouling(POH) Shop,Crain Shop and Workshop Management Training	4
	Workshop training(Carriage) Mysore(MYS), Ajmer Junction(,AII), Lower Parel(PL), Liluah(LLH), Lalgudah(LGD) etc	1
	Coaching Depot at New Delhi(NDLS), Hazarat Nizamuddin(NZM),Bombay Central Terminal(BCT), Santeraganchi Junction(SRC), Rajendra Nagar Coaching Complex(RNCC),Basin Bridge Depot (BBQ), Hawarah(HWH), Chatrapati Shivaji Terminal(CSTM) etc	1
	Freight yard and ROH @ Umbala(UMB), New Katni Junction(NKJ), New Jalpaigudi(NJP), Bhilai(BIA,) etc	1
	DEMU/MEMU Shed	1
	Power organization @ any division in NF railway	1
	PSU training at Delhi Metro Rail Corporation(DMRC)	1
Zonal Training	Zonal Headquarter Training	1
	Division Training	1

	On the Job Training at allotted Zone	8
Grand Total(Weeks)		78

2.4 Indian Railway Institute for Civil Engineering(IRICEN)

Fig 3. Indian Railway Institute for Civil Engineers, Pune, Maharashtra

IRICEN is the training institute for the Civil Engineers of Indian Railways. The institute had a modest start in 1959 as the Permanent Way Training School for training entry-level Civil Engineers. Now it is a Centralized Training Institute and trains officers of the Indian Railway Service for Engineers(IRSE) cadre of the Indian Railways. Located in the historical and cultural city of Pune, IRICEN imparts training to up to 100 engineers/managers at a time. Engineers from railways of developing countries as well as other government departments/private organizations are also trained. The training programme is generally residential in nature. Available infrastructure for conducting various training programmes includes a well-stocked

technical library, computer centre, material testing laboratory, model room/museum, hostel, mess and recreational facilities for the trainee officers.

For achieving excellence in training, IRICEN has obtained ISO 9001-2000 certification. As per the letter of certification issued by M/s Det Norske Veritas(DNV) Holland (the certifying

body). The institute also trains Railway Engineers for other agencies including RITES, IRCON etc. IRICEN is one of the seven centralized training institutes that share the task of training officers. Engineers from Railways of the developing countries as well as other government departments/private organizations are also trained. The IRICEN is the CTI for IRSE probationers. It also trained Engineers from railways of the developing countries as well as other government departments/private organizations.

2.4.1 IRSE Probationer Training Plan

IRICEN has made 78 weekly training plan for IRSE probationers based on the railway board plan which is following-

Table 11. Training Plan of IRSE

Unit	Course	No of Weeks
Other than Civil Engg Units	AFP: Foundation Course at NAIR	10
	AIP: Induction Course at NAIR	4
	Appreciation Course(including Green and Clean Energy) at IRIEEN, Nasik Road	1

	Appreciation Course(including Environment and Housekeeping) at IRIMEE, Jamalpur	1
	Appreciation Course at IRISET, Sicunderabad	1
	Appreciation Course (including disaster management) at IRITM, Lucknow	1
	Finance for Non-Finance Probationers at IRIFM, Sicunderabad	1
	Personality Development & Assessment of competency(at NAIR, Vadodara)	1
	Parliamentary Training and visit to Dr Ambedkar International Centre(DAIC), New Delhi	1
	President Call-on and Railway Board Training	1
Other than Railway Units	Rural Attachment	1
	Training in “Ethics in Governance”(at Panchgani)	1
	Foreign Training(suitable place/country) decided by Railway Board through NAIR	1
IRICEN	Introductory Course at Indian Railways Institute of Civil Engineering, Pune	1
	Phase-I Course ,This course will cover the basic Technology of Permanent Way, Bridges and Works	8

	Phase-II Course ,This course will cover the advance topic of Permanent Way, Bridges and Works	8
	Mid-review (3 slots of one week each)	3
	Posting Examination and Relieving,at IRICEN, Pune	1
	Orientation Course	1
External Civil Engg. Unit	Indian Railways Track Machines Training Centre (IRTMTC), Allahabad The course will cover basic principles, functioning of prime movers, pneumatic systems, hydraulic systems, electrical systems, mechanical systems and general principles of lining and levelling systems. The training should cover all aspects of maintenance of track machine, assembly and overhauling.	2
	Any one of the Production Unit	1
	Training at Research Design and Standard Organisation(RDSO), Lucknow, including a visit to Thermite Portion Plant(TPP), Lucknow	1
	Training in any one PSU	1
Training in Principal Chief Engineer's	Acquaintance with organizational set up of HQ office of the Engg, Department, meeting the various HQ officers(General Manager(GM), Principle Chief	1

Office	Engineer(PCE), Chief Project Director(CPD)/Bridge Work(BW), Chief Track Engineer(CTE), Chief Bridge Engineer(CBE), Chief Planning Design Engineer(CPDE), Chief EngineerCE/Track Machine(TMC), CE/Works(WS), etc) Training in the Works/planning section. Training in the Track section. Training in the Track Machine section. Training in the Bridge section. Training in the General(Works) section.	
Field training	Training with Senior Section Engineer(SSE)/Section Engineer(SE) (Works)	1
	Training with SSE/SE (P. Way)	6
	Bridge Training with Dy.CE(Bridge Line)/HQ	1
	Bridge Training with SSE/SE(Bridge)	1
	Training with Dy.CE/Track Machine(Line)	1
	Training with Senior Divisional Engineer	1
	Training in Survey & Construction	4
	J & K Project and N.F.Railway Project training	2
	Training with Assistant Engineer(Assistant Divisional	8

	Engineer(ADEN) attachment)	
Grand Total(Weeks)		78

2.5 Indian Railway Institute for Transport Management(IRITM)

Fig 4. Indian Railways Institute of Transport Management, Lucknow, Uttar Pradesh

In order to teach Probationary officers joining the Indian Railway Traffic Service, the Indian Railways Institute of Transport Management (IRITM), Lucknow, was founded in 2003. For in-service officers, IRITM also offers a number of specific courses to help them prepare for the shifting business environment in India and the ensuing changes in the transportation industry. Several of these courses are in the fields of project management, supply chain management, logistics, information technology, and public-private partnerships

Since its establishment twenty years ago, IRITM has developed into one of the renowned Centralized Training Institutes (CTI) with cutting-edge training facilities. It has a very good library, online laboratories for FOIS, PRS, and UTS, and a nicely furnished hostel with

kitchen amenities. Mid-career and special courses are also provided for in-service Railway Officers from Junior Scale to HAG level in addition to providing training to IRTS Probationary officers. Also, on a regular basis, special courses on computer-based railway services like Freight Operations Information Services (FOIS) and Passenger Reservation Systems (PRS) are organised.

In the outskirts of Lucknow, IRITM is located on a vast, 71-acre campus that is covered in lush greenery. The campus is home to a vast variety of plants and animals, including peacocks and stunning migrating birds that can be seen freely moving around.

2.5.1 IRITM has made 78 weekly training plans for IRTS probationers based on the railway board plan which is the following-

Table 12. Training Plan of IRTS

Training Programme	Week sequence
JOINING AT IRITM	1
IRITM (Communication Skills)	2
IRITM	3
IRITM	5

AFP AT NAIR (1/9)	6
AFP AT NAIR (2/9)	7
AFP AT NAIR (3/9)	8
AFP AT NAIR (4/9)	9
AFP AT NAIR (5/9)	10
AFP AT NAIR (6/9)	11
AFP AT NAIR (7/9)	12
AFP AT NAIR (8/9)	13
AFP AT NAIR (9/9)	14
PHASE I Zonal Railway Training Institute(ZRTI) UDAIPUR TRG (1/8)	15

PHASE I ZRTI UDAIPUR TRG (2/8)	16
PHASE I ZRTI UDAIPUR TRG (3/8)	17
PHASE I ZRTI UDAIPUR TRG (4/8)	18
PHASE I ZRTI UDAIPUR TRG (5/8)	19
PHASE I ZRTI UDAIPUR TRG (6/8)	20
PHASE I ZRTI UDAIPUR TRG (7/8)	21
PHASE I ZRTI UDAIPUR TRG (8/8)	22
PHASE II / IRITM (1/6)	23
PHASE II / IRITM (2/6)	24
IRTS P 2018 BATCH VALEDICTION (3/6)	25

PHASE II / IRITM (3/6)	26
PHASE II / IRITM (4/6)	27
PHASE II / IRITM (5/6)	28
IRIMEE APPRECIATION (1/6) Online IRITM (Lucknow divisions Control Visit on 03.07.2021) & (30 OTs footplate in NR 11715 RA IRITM/chord line to LKO STN on 03.07.2021 A/N)	29
NAIR CAPD (2/6) Online IRITM	30
IRISET APPRECIATION (3/6) Online IRITM (Visit to LJN/NER Coaching complex on 17.07.2021)	31
IRICEN APPRECIATION (4/6) Online IRITM	32
IRIEEN APPRECIATION (5/6) Online IRITM	33
IRIFM APPRECIATION (6/6) Online IRITM	34

PHASE III / IRITM (1/6) Visit to LKO/LJN Parcel Office on 10.08.2021 (A/N)	35
PHASE III / IRITM (2/6) **PHASE II EXAM 19.08.2021**	36
ON JOB TRAINING (1/8)	37
ON JOB TRAINING (2/8)	38
ON JOB TRAINING (3/8)	39
ON JOB TRAINING (4/8)	40
ON JOB TRAINING (5/8)	41
ON JOB TRAINING (6/8)	42
ON JOB TRAINING (7/8)	43
ON JOB TRAINING (8/8)	44

IT TRAINING AT IRITM	45
IT TRAINING AT IRITM	46
Supplementary Exam & OJT Project Presentation (3/6)	47
CORE AREA TRAINING (1/6)	48
CORE AREA TRAINING (2/6)	49
22.11.2021 ORIENTATION AT SENA BHAWAN ARMY ATTACHMENT JAMMU/BBMN/FRONT POST	50
CORE AREA TRAINING (3/6)	51
CORE AREA TRAINING (4/6)	52
CORE AREA TRAINING (5/6)	53
CORE AREA TRAINING (6/6)	54

DIVISIONAL ATTACHMENT FOR PROJECT DATA COLLECTION	55
DIVISIONAL ATTACHMENT	56
ONLINE ETHICS AND LEADERSHIP ICC PANCHGANI	57
PHASE III / IRITM (4/6)	58
PHASE III / IRITM (5/6)	59
PHASE III / IRITM (6/6) PHASE III EXAM	60
ONLINE National Railway Training Institute (NRTI)MGMT TRG (1/8)	61
ONLINE NRTI MGMT TRG (2/8)	62
ONLINE NRTI MGMT TRG (3/8)	63
NRTI MGMT TRG (4/8)	64
NRTI MGMT TRG (5/8)	65

NRTI MGMT TRG (6/8)	66
NRTI MGMT TRG (7/8)	67
NRTI MGMT TRG (8/8)	68
INDUCTION / NAIR (1/4)	69
INDUCTION/ NAIR (2/4)	70
INDUCTION / NAIR (3/4)	71
INDUCTION / NAIR (4/4)	72
Institute of Secretariat Training and Management (ISTM)	73
Central Beauro of Investigation(CBI) Academy (9-11) CONCOR/DFCCL-2 Days (12-13 May)	74
17/18 National High-Speed Rail Corporation Limited(NHSRCL) & IRCTC Container Corporation (CONCOR)/Dedicated Freight Corridor Corporation Limited(DFCCL)-2 Days (19-20 May)	75

PRIDE (BPST) (23 TO 25 May) 26/27 DMRC/National Rail Museum(NRM)	76
ALLOTTED ZONAL TRG (1/4)	77
ALLOTTED ZONAL TRG (2/4)	78
ALLOTTED ZONAL TRG (3/4)	79
ALLOTTED ZONAL TRG (4/4)	80
END POSTING EXAM 29.06.2022 & 01.07.2022 (Tentative)	81
PROJECT PRESENTATION 04^{th} to 06^{th} July 2022 (Tentative)	82
VIVA VOCE 11^{th} & 12^{th} July 2022 (Tentative) & VALEDICTION	83

2.6 Indian Railway Institute for Electrical Engineering(IRIEEN)

Fig 5. Indian Railway Institute for Electrical Engineering(IRIEEN)

The institute was established in 1988 on Nasik Road in Maharashtra to provide training for the Indian Railways' Electrical Engineers and other departments engaged in operating trains. It can be found on Nasik Road, 188 kilometres northeast of Mumbai. The Director General is in charge of the institute (DG). A group of nine academic members who have necessary technical training as well as real-world experience support DG/IRIEEN.

The Institute offers the following training programmes in accordance with the Railway Board's regulations:

1. IRSSE Probationers' training.
2. Before being absorbed into Group-A services, Group-B Officers attend an integrated orientation course covering all facets of the operation of the Electrical Department.

3. Junior Administrative Grade officials must complete a senior professional development course before being considered for promotion to Selection Grade.

In addition to the aforementioned, throughout the year, short-term special courses and webinars are also held on specialised themes with the most recent technical know-how and in response to requests from zonal railways. In the current era of quick technological innovation, IRIEEN constantly works to stay current in order to convey the necessary knowledge to the trainee officers and employees so they can take full use of the opportunities presented by the new technology.

2.6.1 **Training Details of IRSEE at IRIEEN (Phase I&II)**

IRIEEN conducts a training program for IRSEE Probationers apart from training at NAIR, IRITM, IRISET, IRIFM, IRIMEE and other standard training defined by Railway Board are following-

Table 13. Training Plan of IRSEE

Course	**Subjects Details**	**Duration(Weeks)**
Phase I	Basics of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation, and General Services.	**8**
Phase II	Advanced technology of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation, and	**6**

	General Services.	
	Field + Other common Training as Per RB	**64**

2.7 Indian Railway Institute of Signal Engineering and Telecommunication(IRISET)

Fig 6. Indian Railway Institute of Signal Engineering and Telecommunication, Secunderabad

The Institute, which was established in 1957 by the Ministry of Railways, Government of India, to meet the specialised training requirements of their own staff and officers in the field of Railway Signaling and Telecommunication, now serves the needs of the entire Afro-Asian region.

The Institution is stretched out over around 28.3 hectares and is situated in Secunderabad, Telangana, which is next to Hyderabad, the state capital. IRISET offers foundational and advanced training in railway signalling and telecommunications, both theoretically and practically. It meets the entire training

need of the officers and supervisors in the Indian Railways' Signal and Telecommunication department.

The Economic and Social Commission for Asia and the Pacific (ESCAP) and the United Nations Development Program have authorised IRISET for use (UNDP). It also offers training in railway signalling and telecommunications to businesses in the public and commercial sectors. Also, it educates foreign railway employees.

On the actual campus, there are four hostels: one for officers and three for supervisors. For practical training, the Institute has laboratories for each significant field of railway signalling & telecommunication. Modern teaching tools are available in the lecture halls.

2.7.1 Training Details of IR at IRISET (Phase I&II)

IRISET conducts a training program for IRSSE Probationers apart from training at NAIR, IRITM, IRIEEN, IRIFM, IRIMEE and other standard training defined by Railway Board are following-

Table 14. Training plan of IRSSE

Course	Subjects Details	Duration(Weeks)
Phase-I	This course will cover the basic technologies of signaling, interlocking, telecommunication, block working, passenger information systems, etc	12
Phase-II	This course will cover the advanced technology of signaling, interlocking, telecommunication, block	12

	working, passenger information system, power supply in electrified and non-electrified section, mobile communication, etc	
	Field + Other common Training as Per RB	54

2.8 Indian Railway Institute of Finance Management(IRIFM)

Fig 7. Indian Railway Institute of Finance Management, Secunderabad

The Indian Railway Institute of Financial Management at Secunderabad, a centralized training institute of the Ministry of Railways, was commissioned in December 2019 for the training of Indian Railway Accounts Service officers. The objective of the institute is to give relevant and impactful training to Probationary Officers of the Railway Accounts department as well as to be a Learning Organization by encouraging research to create knowledge centers in diverse areas; the ultimate aim is best possible service to the nation.

The Finance Officer's responsibilities as a Management Accountant at Indian Railways include providing and interpreting financial statements, gathering cost information and creating cost reports, looking into ways to reduce labour and material costs, establishing and using budgetary control procedures, and taking part in all rating/pricing and capital expenditure decisions. This requires a high level of professional knowledge and skill as well as an irrevocable commitment to Management. The Financial Officer is also responsible for ensuring that all public expenditures adhere to the rules of financial propriety. IRIFM is dedicated to providing the newly hired officers with the accounting, financial management, and leadership skills they need.

The institute has a fifteen-acre green campus with five modern classrooms, a spacious auditorium, residential accommodation to cater to eighty officer trainees, a wealth of trees, and excellent sports facilities. The residential experience here is ideal for creating camaraderie and lasting relationships. It is our aim that over the years IRIFM would grow into a center of excellence and come to play a pioneering role in professionalizing railway accounting.

2.8.1 Training Details of IR at IRIFM (Phase I&II)

IRIFM conducts a training program for IRAS Probationers apart from training at NAIR, IRITM, IRIEEN, IRISET, IRIMEE and other standard training defined by Railway Board are following-

Table 15. Training Plan of IRAS

Course	Subjects Details	Duration(Weeks)
Phase-I	This course includes training in Accounting, Financial Management, Macroeconomics, Traffic Accounts, General Expenditure, Book & Budget, Workshop & Store Accounts.	8
Phase-II	This course will cover training in Integrated Payroll and Accounting System(IPAS), Accounting Information Management System(AIMS), National Academy of Direct Tax(NADT), Special modules.	8
	Field + Other common Training as Per RB	62

In the above tables of this chapter all the training plans and curriculum of different eight group 'A' services(IRSME,IRSE,IRTS,IRSEE,IRSS,IRSSE,IRPS&IRAS) in different CTIs are brought to understand the requirement of probationer training which are currently going on to perform the railway activities for the management of the rail transportation services. This consolidation provides the direction to find the common training and specific training in the different institutes. This exercise also provides the direction in making content design of IRMS probationer training.

Chapter 3

Training needs assessment of IRMS

This chapter deals with the training needs assessment of IRMS including all the aspects of management like Human Resources, Material Management, Finance, Operation, Marketing/Commercial and technical like maintenance & manufacturing activities like Locomotive, coaches, wagons, tracks, signaling system, etc. Training need assessment is also covered based on mission karmayogi, make-in-India, atm-nirbhar, and Gatisakti.

3.1 Focus of IRMS training

Indian Railway Management Service(IRMS) will manage all activities at the field level and HQ level from Manufacturing to the maintenance of the rolling stocks, operation of the train, commercial activities like catering, ticketing, parcel and other passenger activities, Finance and accounting, Human Resource Management, Laying and maintenance of all fixed structure like Track, OHE, Signaling, buildings, etc.

IRMS will lead all kinds of staff including technical and nontechnical, which need technical as well as managerial skills. Railways have a lot of social obligations apart from commercial. IRMS needs a skill that can think about services to poor people along with commercial lucrative services so that the growth of the railway required in Amrit kaal can be achieved.

Mission Karmyogi is the capacity-building mission to take the government working from rule-based to role-based. IRMS needs training in line with mission Karmyogi so that the officers become more creative,technology-enabled, constructive, innovative,

imaginative, proactive, professional, energetic, transparent, and enabled. IRMS officers need to handle more than 12 lakh workforce and they have to build their staff capacity in such a way that the mission Karmyogi agenda can be achieved to match the services required to the public. IRMS needs training in the field working so that delivery of the services will be possible based on their role.

3.2 Scope of Training

Railway technology is a mix of civil, mechanical, electrical, electronic, and computer engineering either in manufacturing, building, or maintenance. IRMS officers have to handle all technical activities like manufacturing of coaches, locomotives, and wagons in different Production units and workshops, maintenance and laying of track, OHE and signaling system, etc. To handle manufacturing and maintenance activities IRMS probationer training should include all the basic knowledge of all five engineering mentioned above and pertains to rail technology. Apart from maintenance and manufacturing, the Design work of the components as per the upgradation of the machine is also looked after by officer in the production unit. Training of IRMS in Procurement is one of the most important in railway work which requires material management skills based on the requirement to achieve better quality material at the appropriate time with the minimum level of inventory. IRMS needs training in material procurement skills like making specifications, estimates, tendering, inventory management, etc.

As the Indian railway is the largest employer in the country and on average staff to officer ratio is more than 120. IRMS officers will need to handle a group of staff in any unit of the railway, which requires human resource management skills. Human resource expenditure is the largest expenditure in Indian Railways, i.e. more than 60%

of total expenditure so skills like utilization of staff, multi-skilling, know-how to foster motivation, setting clear objectives, creating a transparent work environment, strong communication and setting clear timeline are needed in IRMS officers.

Today services all over the world are becoming day by day highly specialized. With increasing market competition, most companies are focusing on improving their product quality and showcasing. Therefore companies are re-looking at their business model and try to divide the work into core and non-core activities. Generally, non-core activities are being outsourced to get better products at least price. Outsourcing of the non-core activities in Indian Railway is the prime focus of the government so that staff strength can be right-sized and more capital expenditure can be achieved. IRMS probation has to handle these activities from the first day in the office so they need extensive training in outsourcing the work of non-core activities. This training includes work as well as service contracting, The process of doing contracts includes making proposals, tendering, and execution of the work by an agency.

3.3 Key Areas of Training

Indian Railway is one of the best railways in the world in handling safety aspects of the asset with a lesser no of accidents per million passengers. Being the Lifeline of the nation, Indian Railway has developed a well-structured organization for handling safety and accidents. IRMS officers need the skill set which can prevent accidents and handle accident relief operations effectively. After any accident inquiry, the accident and coming out with healthy and fruitful suggestions is an art of the inquiry officer, which can be built up in IRMS officers using mock-drill and other suitable training.

The IRMS requires training to manage the Commercial Department, which is in charge of marketing and selling the transportation services offered by a railway, as well as of generating and developing traffic, securing and upholding cordial relationships with the trading public and the travelling public, as well as of fostering positive public relations generally. Its duties include include setting rates, fares, and other fees as well as correctly collecting, accounting for, and remitting traffic receipts.

The Accounts of a Railway have to facilitate a General review of the finances of the Railway as a Commercial Enterprise as well as in accordance with the requirements of Government Accounts. Therefore, the objectives of securing the essential requirements of Commercial Accounting and practices of Government Accounting are met by maintaining the link between the two to show how much is coming into the government coffers through the Railways and how much is going out as capital or revenue expenditure out of government coffers as the money being spent on the activities of the railways. The Indian Railway accounting is different from industry practices at large. In the future, these industrial practices are required to be adopted. IRMS needs training to adopt the present skill of accounting and vetting the different estimates or proposals.

As per our Hon'ble Prime Minister Shri Narendra Modi, “Central Government is making record investment to modernize Indian Railways. Now modern trains like Vande Bharat express, Tejas express and Humsafar express are being made in India. In the next eight years, we will see the railway on a new journey of modernization”. This statement shows the vision and expectation of Indian Railways in building a nation as a five trillion economy by 2024-25 and beyond. IRMS needs to be trained in

line with government expectations in building infrastructure in railways at a faster pace so that required GDP growth can be achieved.

India is already building lots of metro railways at par with world-class metros. India is also started building a Bullet train between Ahmadabad to Mumbai, the foundation was laid in 2017 by our Honorable P.M., which will be completed in the next couple of years. There are several other bullet trains planned for the future which will bring a lot of investment in India. The freight corridor project is already on the verge of completion. IRMS officers need exposure to these large projects so that they can contribute as per the requirement for the development of the country.

3.4 Training duration and Institutes

Looking at all aspects of the training assessment for IRMS, it is necessary to provide training in all the CTIs regarding the Engineering and Management part based on their specialization. Common Management training to be provided in NRTI/Gati shakti University in line with mission karma yogi. A minimum level of engineering training is needed, around ten weeks in each engineering at respective CTI, so the total training is proposed as Two years instead of 78 weeks in different services.

In the above, requirement of training area like managerial skill, technical area and field exposure along with duration in different CTIs and in line with mission Karyogi has been assessed for IRMS.

Chapter 4

Content Design for IRMS Probationers

Chapter is focused on designing the course content for IRMS probationers after understanding the course contents of different services and the need assessed in the third chapter of this dissertation. While designing the course contents all the stakeholders of the railway were discussed so that a comprehensive content design along with the duration of the different modules can be proposed.

The Proposed content design for the IRMS Probationer is based on discussions with more than 100 officers discussion and interviewed in different Indian Railways units like CTIs, Railway Board, RDSO, Zone, division, etc, and instruction issued for different group 'A' services in the past as mentioned in chapter one. The total time period for training is 104 weeks is being proposed in place of 78 weeks as prescribed for most of the services. The length of training is proposed based on the requirement of different technical and managerial aspects of the training. The complete content of the training is prescribed below-

Table 16. IRMS probation training content design

Institute	Course	Duration(Weeks)
NAIR	Joining	1
	Foundation	8

	Personality Development + Competency Assessment	1
	Induction course	2
	Foreign Training	1
	J&K and NF Training	2
	President/Parliament/Railway Board	1
	Human Resource Management	5
	Material Management	5
	IRIDM/Hijjala	1
	Rural Attachment	1
IRICEN	Ethics at Panchgani	1
	Phase I Course- This will cover the basic technology of Permanent Way, Bridge and Works.	5
	Phase II Course- This will cover the advanced technology of Permanent Way, Bridge and Works.	5
IRISET	PhaseI Course- This course will cover the basic technology of signalling, interlocking, telecommunication, block working, passenger information system etc	5

	PhaseII Course- This course will cover the advance technology of signalling, interlocking, telecommunication, block working, passenger information system, power supply in electrified and non- electrified section, mobile communication etc	5
IREEN	Phase I Course- This course will cover basics of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation and General Services.	5
	Phase II Course- This course will cover Advanced technology of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation and General Services.	5
IRIMEE	C&W Module	2
	Diesel Traction Module	2
	Workshop Management	1
	Disaster Management	1
	Train-set and DPRS Module	1
	Environmental and Housekeeping	1

	Management(EnHM) Module	
IRITM	Phase I Course- This will cover Train Operation(General Rule,Operating Manual &Accident Manual) and Commercial Management(Booking office, Reservation office, Ticket checking, Passenger amenities, Customer care, Courtesy, Public Grievances, Booking & Delivery of luggage and Goods Working)	5
	Phase II&III -This will cover Overall performance of Indian Railways, Freight Operation,Coaching Operation, Multi-modal Operation, Planning, Commercial,Information Technology, Safety & Disaster Management, Law, Vigilance, Audit & Miscellaneous	5
Gati Shakti University	Training of Management-This will cover Finance accounting, Organizational Behaviour, Transport Economics, Marketing Management, Marketing Research, Big Data Analytic, Operation Research, Human Research Management,Strategic Management, Macro-Economic & Business Environment, Supply Chain Management & Logistic Management.	8
IRIFM	Finance and Accounting	5

Field Visit	Any one of the Loco manufacturing unit BLW or CLW	1
	Any one of the Coach/EMU/Train Set manufacturing units like ICF	1
	Division Visit to understand the working of all the department	2
	Zonal HQ Visit to understand the working of all the department	2
	Research Design and Standard Organization(RDSO) Visit	1
	EMU/MEMU/DEMU shed visit	1
	Electric Shed/Diesel Shed Visit	1
	Station + Traction Distribution Visit	1
	NHSRCL Visit	1
	Japan HSR Visit	1
	DMRC Visit	1
	PSU Visit	1

In the above two-year IRMS probationer proposed training, content design is divided into a different segment of the training which will be coordinated by different CTIs(NAIR,IRIMEE,IRITM,IRISET,IRIEEN,IRIFM,IRICEN&NRTI) with overall

coordination of NAIR. The training content is divided into managerial training for around nine months, technical training for around eleven months, and field training for around four months based on the discussion with different stake holders.

Chapter 5

Detailed Curriculum of Training

This chapter is provided a detailed training curriculum for IRMS probationers based on the last chapter's training content design. The IRMS probationer is proposed to report at NAIR to join the service. All the joining formalities along with overall coordination will be done by NAIR. Detailed training is prescribed based on the training that has been provided in the past in different institutes of the railways and current needs as assessed in the third chapter. The aim of the detailed curriculum is to include all the aspects/topics of the module as designed in the content. Every module period is based on content design.

5.1 Training at NAIR

Detailed training of IRMS Probation is being proposed based on the discussion with all stakeholders and training consolidation done in the last three chapters. Every day three sessions, each session of two hours. The detailed Curriculum at NAIR is following-

Table 17. Detailed Curriculum of IRMS at NAIR

Course	Detailed Curriculum
Joining(15 sessions)	● Registration ● Joining Formalities ● Introductory Session ● Interactive Session

	• Ice-breaking session • Organization familiarization which includes Structure of Indian Railways consists of the Ministry of Railway, Railway Board, Zonal Railways and all departments.
Foundation(120 sessions)	The main objective of the foundation course is to familiarize the IRMS probationers at the beginning of their career with the system of railway working, team building work, building camaraderie, and putting the feeling of a sense of discipline, pride, and dedication. This course includes classroom lectures, field visits, labs, and extra-curricular activities. The course includes- • **Accounts**-Function of account departments, Canons of financial propriety, Statutory Audit, Account inspection of executive offices, Schedule of Power, Tender and Contracts, Budgeting on Railways, Demands for Grants, Budgetary Exercise, Budget documents, Budget cycle, Structure of railway budget, Primary units(objects) of expenditure, traffic earnings, Various Funds maintained by the Indian railways, Internal check of expenditure, cash imp-rest and Earning account role of TIA. • **Personnel**- Organization of Personnel department, Industrial Relation, Railway Servants(Discipline and Appeals) Rule 1968, Railway Service(Conduct) Rule 1966, Railway Servants(Pass) Rule 1986, Allowances, Salary, Welfare Activities.Staff Benefit Fund and Different Kinds of Leave & Leave Rule • **Civil Engineering**-Role of Civil Engineers in the Railways –

	Organizational Structure of Civil Engineering in Open Line and Construction, Principal features of Permanent Way: Rails, Sleepers, Ballast, and Track Fittings, Curves: Need for Curves; Degree of Curve, setting out Circular Curves, Super-elevation on Curves, Cant Excess and Cant Deficiency, Transition Curves, Permissible Speed on Curves, Track Maintenance, Classification, Service Tolerances, Points & Crossings- Basic Components, Permissible Speed, Categories of Engineering Works, Protection for Works of Short and Long Duration, Engineering Indicators, Patrolling of the Railway Lines, Types of Patrolling, Monsoon Patrolling, Duties of Patrolman, Track Gradients, Ruling Gradient, Compensation for Curvature, Vertical Curves, Works requiring CRS Sanction and Rules for Opening of New Railway Lines, Level Crossings, Schedule of Dimensions.Over Dimensional Consignment. ● **Mechanical Engineering**- Organization of Mechanical Engineering Department in Railway Board, Zonal Headquarters, Divisions and Workshops, Objectives of Mechanical Engineering Department, Classification of Rolling Stock, Wagon Stock- Design and Maintenance, Coaching Stock- Design and Maintenance, Linen Management, Bio-Toilet, Traction Modes and their Comparison, Diesel Locomotive – Design Features, Major Components, Classification and Codification, Operation, and Maintenance of Diesel Locomotives, Train Dynamics,

	Important Components affecting Safety – Wheel Assembly, Suspension Arrangement, Draw and Buffing Gears, Brake System on Indian Railways - Vacuum Brakes and Air Brakes,140 Ton Diesel Break-Down Cranes, Workshops and Production Units ● **Electrical Engineering-** Organization of Electrical Department, Basics of Electrical Engineering, Electrical General Services, Train Lighting, Air-Conditioning, Traction Distribution (TRD), OHE Configuration and other details, Fixing of Maximum Demand and its Financial Implications, Electric Locomotive/EMU, Three Phase Application for Traction Technology and Energy Conservation. ● **Signal and Telecom Engg.-**Organization of S&T Department, Introduction and History of Railway Signaling, Development of Signaling over Indian Railways, Requirement of Signaling & Important Definitions from General Rules, Evolution of Signaling Systems, Basic Concepts of Signaling, Signal Layouts, Signal Operations, Point Operation, Essentials of Interlocking, Standards of Interlocking, Track Circuits, Slotting and Inter-cabin Control, Block Instruments, Automatic Block Working, Route Relay Interlocking/Panel Interlocking & Electronic Interlocking, Telecommunication, Common Abbreviations used in Railway Signaling. ● **Operation-**An Introduction to Rail Transport, Organization of

	Operating Department, Functions of Operating Department Books of Reference, Classification of Traffic, Types of Trains Operating Control Organization & Functions, Passenger Train Operations, Time Tables, Goods Trains Operation, Marshal-ling Yards, Line Capacity and Throughput, Information and Communication Technology Applications in Train Operations. ● **Commercial-** Introduction to Commercial Department, Organization of Commercial Department, Functions of the Commercial Department, Books of Reference, Railway Websites, Passenger Business, Working in the Booking Office, Reservation of Accommodation, Cancellation of Reservation and Refund of Fare on Unused or Partially Used Tickets, Facility of Attendants, Other Miscellaneous Rules, Goods Business, Procedure of Booking Goods Traffic, Open Delivery and Assessment Delivery, Demur-rage and Wharf-age, Re-booking and Diversion, Parcel Business, Scales of Parcel Booking, Carriage of Luggage, Claims, Liabilities of Railways and Railway Claims Tribunal (RCT), NR Cell, Carriage of Railway Materials and Stores. ● **Material Management/Store-** Introduction, Classification of stores, Standard Nomenclature Lists, Requisitioning and Distribution of Stores, Recoupment, Purchasing, Receipt & Inspection of Stores, Returned Stores, Surplus Stores, Inventory Control, Scrap Disposal, Import, Introduction to Supply Chain

	Management. ● **Law**- Basics of Law (Definition, Civil & Criminal Law, Writs, etc.), Railway Security (RPF & Government Railway Police(GRP) and their Duties), The Railway Act, 1989 (Penalties & Offence), Railway Property (Unlawful Possession) Act, 1966, Consumer Protection Act, 1986, Public Premises (Eviction of Unauthorized Occupants) Act, 1971, Arbitration and Conciliation Act, 1996, Administrative Tribunal Act, 1985 (CAT), Factories Act, 1948, Payment of Wages Act, 1936, Employee's Compensation Act, 1923, Industrial Dispute Act, 1947, Indian Contract Act, 1872, Cyber Laws in India, Right to Information Act, 2005 (RTI) ● **Medical**-Medical Reimbursement Rules, Medical Examination, Medical Board, Medical Certification, Medical Treatment & Attendance Rule. ● **Security -** Introduction, Structure and role of RPF
Personality Development and Competency Assessment(15 sessions)	This course will cover the Concept of Personality, Dimensions of Personality, Significance of Personality development, Concept of Success and Failure, Factors responsible for Success and Failure-SWOT analysis, Concept of Attitude and Motivation, the significance of motivation, Concept of Self-Esteem, Do's and Don'ts to develop positive self-esteem. A general guideline for filling up the Performance Appraisal Form, How to do a competency assessment of subordinates.

Induction(30 sessions)	The objective of this course is to weave together various modules of training undergone by the Probationers and to equip them with relevant skills and knowledge for taking up a working post. The pedagogy includes classroom sessions, field visits, mock drills, and extra-curricular activities. The course includes the following- ● **Law**- Protection of Child rights and related laws, Court related proceedings, arbitration, litigation, and RTI. ● **Electrical Engg**- Ren**e**wable energy, Green Environment, reducing global carbon footprint, United Nations Framework Convention on Climate Change(UNFCCC) Conferences, Energy efficiency in Mass Transportation Systems, Energy Conservation initiatives, alternative fuel initiatives. ● **Mechanical Engg**- Machinery and Plant Programme, Quality Overview, and Lean Management. ● **Managerial Skills - L**eadership, Role of Assistant officer as a leader, Manager, and Technocrat, Decision making at different levels of the management, Status of Indian Railways in the global scenario, Crisis Management, Innovations, and Group Behaviour. ● **Personnel Management**- Discipline and Appeal Rules(DAR), Reservation Policy, New Pension Scheme(NPS), Selection, Promotion, Trade test, Industrial Relation, Office Preceding, File maintenance, No-tings, Correspondence, Performance Appraisal, and Smart Performance Appraisal Report Recording Online

	Window(SPARROW), Conduct Rule, Use of IT/Personnel and Account(IPAS), Mock Permanent Negotiating Machinery (PNM). ● **Safety**-Accident site management, Conducting Accident inquiries and follow-up, Unusual working, Disaster Management, Model Room, and Mock Drill. ● **Customer Care**- Latest Initiative & future road map of Indian Railways for Customer care and amenities. ● **Stores**- E-Tendering, Indian Railways E-Procurement System(IREPS) and Government e-Marketplace(GeM), Procurement of Stock and Non- Stock items, and supply chain management. ● **Tender & Contracts**- Tender and contracts Do's and Don'ts, Works Contracts. ● **Transport Management**- Operation Management and Maintenance Block. ● **Financial Management**- Estimates and Costing, Expenditure Control, IR budget & Financial Performance, Financial Statics, Stock Verification. ● **Health Management**- Stress Management, Medical Reimbursement, and other medical facilities. ● Vigilance- Vigilance Do's and Don't s. ● IT- E-office, Emerging technology, and IR ● Miscellaneous- Rajbhasha, Ethics, Community visit, and

	Achiever series.
Foreign Training(one week, 15 sessions)	This training needs to be conducted in Europe/Japan/South Korea/China- All the Probationers are needs to be divided into three to four groups and sent to different countries for study visits which should include the following contents- ● The concept of "punctuality/on time", which is a central policy of Foreign railways, was conveyed to the Indian trainees, who were instructed in the importance of punctuality as part of the training. ● Characteristics of Foreign railways, Safety management, Foreign railway technology, Station development, Project works, and transportation nodes. ● Training centers working, rolling stock centers, command or control centers, terminal stations, railway museums, rolling stock manufacturers, Research centers, and other manufacturers of railway-related equipment.
J&K and NF Training(30 sessions)	The basic purpose of a Field Visit is to understand the challenges and opportunities in J&K and NF. This Field training covers the following - ● Visit all big installations like stations, DEMU/EMU Sheds, Project offices, and different project sites. ● Training at NF zonal HQ, meeting GM and all the Principle Head Of Department(PHOD) to understand the Zonal working.
President/Parliament/Railway	● This visit and training at Parliament house covers the meeting of IRMS probationers to the president at Rashtrapati Bhavan, to to

Board(15 sessions)	understand the functioning of Parliament's proceedings, attending parliament sessions, meeting with members of parliament and understanding of government employee accountability to the parliament and parliament procedure. ● The training at Railway Boards covers Various Directorates, Technical Instructions, Office Orders, Meeting the Director of concerned Directorates, See how budget planning is done. See how the Works Program, Machinery & Plants(M&P) Program, and Rolling stock program is finalized.
Human Resource Management(75 sessions)	The objective of this course is to understand the working of personnel departments, concepts, and terminologies include- ● Recruitment, Training, Confirmation, Re-employment, Rules governing the promotion of subordinate staff, Rules regulating seniority of non-gazetted Railway servants and Percentage of Posts fixed for various categories. ● Scale of Pay applicable to Principal Categories of non-gazetted staff, Pay, Increments, Efficiency bars, Compensatory & other allowances, Dearness allowances, Running allowances rules, Arrears claims & recoveries of over payments, Advances, Change in the name. ● Absorption of medically incapacitated staff in alternative employment, Forwarding of applications from serving Railway employees for posts outside Railways, Terms and conditions

	applicable to Railway servants & substitutes in Temporary services, Holidays & Special Casual leave. ● Railway quarters and Recovery of rent, Attachments of pay, and allowances for Debt. ● Apprentices, Casual laborers. ● Use of Staff Cars, Staff Welfare. ● Co-operative Societies, Grant-in-Aid, Rules for recognition of service associations of Railway servants, Staff councils, and negotiating Machinery.
Material Management(75 sessions)	The objective of this course is to learn the working of store departments which includes- ● **Introductory**-The Controller of Stores structure, Functions of the Controller of Stores, General Supervisory Control, Planning of Supplies of Stores, Purchase of Stores, Nature, and distribution of stocks, Location of Stores Depot, Ordinary Stores, Emergency Stores, Non-stock items, Special Stores, Surplus Stores, Main Depots, Minimum stock, Maximum stock, Minima and Maxima for Workshop Items, Powers of Controller of Stores , Canons of Financial Propriety. ● Stores Nomenclature and Price Lists Standard Classification of Stores, Standard Nomenclature of Stores, Part Number Code, Standard specifications and drawings, Rates for new Stores, Schedule of Scrap, and Book rate for scrap. ● **Store Purchase Policy and Rules**-Source of supply, Order of

	preference, Quality, Price Preference, Currency of Payment, Payments, Powers of General Manager, Publicity, Country of manufacture, Evaluation of offers involving payment in foreign currency, Place of delivery, Price preference for early delivery, Indian agents for tenderer Abroad, Cost of Tender Forms, Classes of Tenders, The Open Tender System, The Limited Tender System, List of approved firms, The Single Tender System, Powers of General Managers to cover exceptional cases, Tender Notices, Tender documents, Tender forms, Waive off of Earnest Money, Opening of tenders, Constitution of the Tender Committee, Intimation of acceptance of tenders, Freight factor in the purchase of material, Dividing of contracts, Locomotive and Rolling stock components, Contracts for Work and Stores, Recommendations for price preference, the Inspection, Inter-departmental purchases. ● **Contracts-** Schedule Contracts, Piece Work Contracts, Rate Contracts, Running Contracts, Fixed Delivery Contracts, Competency of Authorities to Execute Contracts, Contract Documents, Conditions of Contracts, Specifications, Warranty, Marking of Railway Materials, Rates, Quantities, Nomenclature Agreement Forms, Competency of Authorities to vary contracts, Variation of Indian Railways Standard conditions of Contract, Variations of the rates of Items, Variations of Quantities of any item, Repeat Orders, Variation of the Items, Extension of

	delivery dates, Modifications, Security, Stamp Duty, Execution of Contracts Prior to the commencement of works or supplies.. ● **Contract Estimate-** Contract Estimates of Depots, Guidelines on filling up of Contract Estimate Sheets, Guidelines on preparing Contract Grouping Forms, Advise Note, Material Outstanding with Firm , Tender Schedules,Items procured by a Central Agency, Forcing of Surplus/Overstock, Shop Manufactured Items, Acceptance of Tenders, The main and Subsidiary Depots , History-cum-Rate Card, Guidelines for filling up History-cum-Rate Card, Agreement for purchase of Permanent Way Materials, Item procured through Railway Board, Items procured by the Railways. ● **Purchase Procedure**-Agency for supply & purchases, Purchase by the Railway Board, Purchases arranged by the Administration , Direct purchase of Directorate General of Supplies and Disposal Items, Modes of Direct Purchase, Bulletin and Daily Tenders, Local purchase of Materials of small value and of Stores by Divisional Railway Managers(DRMs), Chief Engineers(CEs)(C), Chief Signal & Telecom Engineers(CSTEs)(C), Chief Electrical Engineers(CEEs)(C) of Railways, Railway Electrification(R.E), and other offices not attached to the Stores Department, Opening of Current Accounts against Cash, Imp-rest by Stores Officers, Accountal of local purchases, Purchase Orders, The Supply Forms, Supplier's Challan , Combined

	Receipt and Issue Notes , Part Supplies , Distribution , Submission of Requisitions , Scrutiny of Requisitions in the Depot , Registration of Requisitions, Directorate General of Supplies and Disposal Items , Items Purchased by the Railways , Forcing of Stock Items, Pricing of Purchase Orders , Procedure for payment of Supplier's Bill in respect of Direct Delivery Orders, Ledger Cards of Stores obtained for Trial, Stocking Arrangements , Record of Trials , Orders on other Zonal Railways/Production units,Materials Purchased Abroad , Procedure of Inspection , Rejected Stores , Rejection Memo , Rejection Register , Reminder system for overdue Deliveries, Risk Purchase and the Method of dealing with Defaulting Firms, Standard Weight , Materials with No Tolerances. ● Procedure of Purchase through the Directorate General of supplies and disposals. ● Purchase of Sleepers and Stores, Printing Stores, and Printing Forms.
IRIDM/Hijjala(15 sessions)	Introduction to IRIDM & Disaster Management(DM) scenario in IR, Disaster Management act 2005 and Disaster Management policy and DM plans, Site & Role of core departments at the accident site, Importance of Railway Safety & Role of CRS-enquiries & case studies.First aid, Trauma management and Handling of casualties and injured, etc, Emergency Response/Rescue techniques, Cardiopulmonary Resuscitation(CPR) & First aid(Practical), 140 T crane operation and

	demonstration on coaches restoration (Theory & practical), Introduction to accident investigation, Fire fighting theory & practical, Introduction to various tools and equipment of ART, Role of National Institute of Disaster Management(NIDM), National Disaster Response Force(NDRF), State Disaster Response Force(SDRF), Civil Defense, Fire Service in DM, Case studies on different train accidents, Stress Management & Communication at the accident site.
Rural Attachment(15 sessions)	All the Probationary officers are divided into 10 groups and are needed to attach different states' rural visits to understand real India's aspirations and requirements from a transportation and employment perspective.

5.2 Training at IRICEN

The detailed training at IRICEN is made based on the training given to IRSE offices and discussions with IRSE officers. The training is designed for 11 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 18.Detailed Curriculum of IRMS at IRICEN

Course	Detailed Curriculum
Ethics at Panchgani(15 sessions)	The objective of the course is to discharge the duties following the guideline of the code of conduct as prescribed in the rules and ethics required in the standard society. The training includes- Principles and

	norms for such ethical conduct including, among others, honesty, integrity, professionalism, fairness, accountability, credibility, diligence, respect for everyone, a sense of responsibility for the job, the primacy of the railway's interests over personal interests, loyalty to the Railways, respect of the law of the land, staying above the temptation to utilize official position or knowledge for personal gain, and a strong sense of right or wrong.
Phase I & II Course- This will cover the basic and advanced technology of Permanent Ways, Bridge, and Works. (150 sessions)	The objective of this course is to understand the basic and advanced the the technology of Permanent Ways, Bridges, and Works. The module will cover the following topics- ● **Duties** of Permanent Way officials including ADEN, SSE/P.WAY, Junior Engineer(JE/)P.WAY, SSE/W, JE/W, SSE/Bridge, JE/Bridge Gang Mates, Keymen, Patrolmen, Gateman and Track maintainer ● **Concept of Track Structure** -Study of Track structure and its components, Rail & Rail Fastenings, Sleepers & Fastenings, Ballast, Formation, Insulated Joints & Switch Expansion Joints, and Track structure on the bridge. ● **Insulation and Maintenance of Welded Rails**- Study of the maintenance and insulation of different welded rails i.e. Alumino Thermit Welding of Rails, Flash-butt welding of Rails, Short welded rails and Long welded rails. ● **Concept of Curve**- This includes Determination of Radius, The Reference Rail for level, Safe Speed on Curves, Super-elevation,

	Cant Deficiency and Cant Excess, Length of Transition Curve and Setting-out Transitions, Running out Super-elevation, Indicators/Boards Provided in Curves, Speed over Turnout on Curves, Permissible Speed over Curved Main Line at Turnouts, elevation over Turnouts, Curves of Contrary Flexure, Curves of Similar Flexure.Curves with Cross Overs, Curves with Diamond Crossing, Extra Clearance on Curves, Compensation for Curvature on Gradient and Vertical Curve. It also includes realignment of Curves and Points & Crossings ● **Track Monitoring and Tolerances**- Brief about Track Recording Car(TRC), Quick Calibration, Recording and Speed, Frequency of Track recording, Track Geometry Parameters recording, Chords for measurements and report, Reporting of TRC results, Track Quality Index (TQI), Oscillation monitoring system, Recording of defects, Classification of Track Quality, Oscillograph Car, Use of Oscillograph Car Recordings and Track Tolerances. ● **Maintenance of Permanent Way**- This includes an Annual Programme of Track Maintenance, Maintenance Planning, Mechanized Track Maintenance System, Systematic tamping of plain track and Points & Crossings, Picking Up Slacks, Through Packing by Conventional Manual Method, Observance of Sleepers under Passage of Traffic, Systematic Overhauling. Handling and Maintenance of Rails, Sleepers, Fastenings and

	other Miscellaneous items.Works incidental to regular track maintenance, Record keeping, and Maintenance of track in track circulated area and in electrified sections. ● **Permanent Way Renewals**-Classification of Renewals, Factors Governing Permanent Way Renewal, Planning of Renewals, Track Renewal Programme, Track Standards for Renewals, Planning for Posting of Staff and Other Facilities, Traffic Facilities for Renewals, Speed Restrictions, Project Report for Track Renewal Works, Preliminary Works, Unloading of Rails, Sleepers and Fastenings, Methods of Carrying Out Renewal, Relaying with Mechanical Equipment, Manual Method of Relaying, Essential Points to be observed during Linking, Track Laying standards, Renewal of Points and Crossing, Renewal of Track Fittings and other track components, Sleepers in Yards and Running Lines, Rails in Station Yards, Classification and Use of Released Material, Marking of Permanent Way Material and Works to be attended after completion of relaying. ● Engineering Restriction & Indicators, Working of trolley, lorry, track machine, material trains and loading & unloading of hopper ballast Wagons. ● Working of Level Crossing & Gate-man, Patrolling of Railway Lines, Action during accidents including breaches and pre-monsoon precautionary measures, Commissioner of Railway Safety(CRS) sanction for works affecting Passenger running

	lines, Track Management System working and training courses. ● **Works Planning and Maintenance-** Planning of Railway Staff Colonies, General Design Requirement of Buildings, Water Supply to Stations and Staff Quarters, Scale of Fitments for Water Supply, Sanitation and Drainage, Plinth Area for Various Types of Quarters, Basic Amenities in Staff Quarters, Type of Flooring, Wall Surface and Colour of Wood and Steel, Use of New Materials, Colours for Timber Steel-Work and Walls in General, Rest Houses, Allotment of.Rest House, Railway Institute, Construction of Rail Mail Service(R.M.S). Buildings in Railway Premises, Buildings for Railway Police, Construction of Quarters/Barracks for Government Railway Police(GRP) Personnel by the Railway, Provision of Chicks and Venetian Blinds, Additions and Alterations to Quarters, Block Numbering of Buildings and Structures, Building Registers, Transfer of Buildings, Responsibilities of Staff Occupying Quarters. ● Inspection and maintenance of the building, Inspection of steel structure and timber work by Assistant Engineer and Section Engineer, Maintenance of the sanitary and hygienic condition of the station building, yard, and railway colony. ● Maintenance and execution of Water supply, open wells, deep tube-wells, impounding reservoirs, infiltration galleries, pipelines, water treatment, and high levels of storage. ● Maintenance of Drainage and Sewerage, Garden and Plantation,

	Acquisition & Management of Land. ● Preparation of Plan, Storage and use of Explosives. ● **Bridge**- Maintenance of Foundation, Protective Works and Waterways. Maintenance of substructures like Abutments, piers, wing walls and return walls and arches and their common repair techniques. Maintenance of superstructure of steel and composite girders.Maintenance of Bed Blocks and Bearings. Maintenance of tunnels and deep cutting. ● Training on Investigation and survey for construction of Bridges, Construction of foundations, Rehabilitation of Brides, construction of superstructure, fabrication and erection of steel girders.

5.3 Training at IRISET

The detailed training at IRISET is made based on the training given to IRSSE offices and discussions with IRSSE officers. The training is designed for 10 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 19.Detailed Curriculum of IRMS at IRISET

Course	Detailed Curriculum
PhaseI Course-	This course includes theory as well as practicals in the lab. The training

This course will cover the basic technology of signaling, interlocking, telecommunication, block working, and passenger information system etc(75 sessions)	covers- **Theory**- Basics of Signaling Engineering, Principal of Interlocking, Mechanical signaling(Single Wire & Rodding), Locking table, Signaling Relays and Cables, Train Detection(Track circuits), Electric Point machine, Colour light and automatic signaling, Interlocking with Metal-Carbon Relays, Data communication & Network, Radio Propagation, Telecom cables(Copper), Public address system, Passenger Information System, Train Traffic Control, PDH Principle, Integrated Service Digital Network(ISDN) Exchange Advancements, Signaling in telecommunications. **Practicals**- All the theories to be understood in the Lab environment of Electrical Signaling Lab, Block Lab, Outdoor signaling lab, Train detection lab, Train traffic control lab, Outdoor telecom lab, Passenger Information lab, Telephony lab and Transmission lab.
Phase II Course- This course will cover the advanced technology of signaling, interlocking, telecommunica	This course includes theory as well as practicals in the lab. The training covers- **Theory**- Signaling in 25 KV AC Electrified, Signaling General, Power supply for signaling, Interlocking with Metal-Metal Relays, Panel Interlocking with Metal-Metal Relays, RRI Siemens, Circuit Practice-Siemens, Electronic interlocking, Tokenless Block Instrument for S.L., Intermediate Block Signaling, BPAC, Train detection-Analog & Digital axle counters, Signaling safety & accidents case study, Data Loggers, Automatic Warning System(AWS), Train Protection and Warning

tion, block working, passenger information systems, power supply in electrified and non-electrified sections, mobile communication etc(75 sessions)	System(TPWS), European Train Control System(ETCS), Anti-collision Device(ACD), TCAS, Signaling Installation & Quality, Power supply arrangements, Earthing & Surge Protection for telecom installations, OFC Systems, Synchronous Digital Hierarchy(SDH) Principles, Mobile Communication, Data Networks of IR, Internet Protocol(IP) Telephony and Next Generation Network(NGN), Network security on computer networks, Vigilance, Tender & Contracts, Disaster Management & Accident communication. **Practicals**-All the theory to be understood in the Lab environment of the Electrical Signaling Lab, Block Lab, Outdoor telecom lab, Passenger Information lab, Telephony lab Transmission lab, Very High Frequency(VHF) Set programming and power measurement, Programming of Wi-Fi Modem, Networking Lab and Computer Hardware.

5.4 Training at IRIEEN

The detailed training at IRIEEN is made based on the training given to IRSEE offices and discussions with IRSEE officers. The training is designed for 10 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 20.Detailed Curriculum of IRMS at IRIEEN

Course	Detailed Curriculum
Phase I Course- This course will cover basics of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation, and General Services. (75 sessions)	**Traction Rolling Stock** - TRS (Conventional Locomotives + 3 Phase Locomotive) - Organizational Structure & Types of Locomotives, General Working of Electric Loco Shed, Power, Auxiliary & Brake Circuit (IRAVB2, E-70 & CCB) of AC Locomotives, Control Circuit including DJ & SMGR Circuit for Conventional Locomotive, Vehicle Control Electronics for 3 Phase Locomotives, Loco Equipment at the roof . Plans for Minor and Major Maintenance (Excluding POH/MTR), Condition Monitoring Techniques for Loco Maintenance, Case Studies, a quiz, and videos linked to the aforementioned themes. **Traction Distribution -TRD** Introduction: Organizational Structure and Responsibilities of Officers and Staff, Fundamental Principles of OHE Design, Sectioning Principles of OHE, Electrified vs. Non-Electrified Territory Bonds, foundations, structures, cantilevers, jumpers, turnouts & crossovers, auto tensioning division (ATD), etc. are examples of overhead equipment. Describe power supply installations Traction power controller (TPC) description, maintenance depot description, and tower waggon description Video Documentaries on the aforementioned subjects, Case Studies, and Tests. **Coaching (ICF + LHB Coaches Topics)** Roles & Organizational Structure, a description of the various train lighting systems, the various

	coach types, coach wiring, lighting, fans, and pantry goods, Various Varieties of Batteries & Maintenance, Drive-System & Belts, Alternators & Regulators, The basics of air conditioning, definitions of several terminology, including TR, COP, BTU, etc. Coaches' air conditioning systems, Calculating heat load, doing pre-cooling and pull-down tests, Systems for End-on-Generation, Head-on-Generation, and Parallel Operation Test (Dyno-drive), functioning coaching depot Chart of pit jobs, care for sick people, both initial and subsequent upkeep, Schedules for maintenance: trip, monthly, quarterly, and IOH, Rake Links, Coaches Required, Benchmarking for Staff and Manpower Ratio, duties of the AC coach in-charge and the AC coach attendant, as well as the equipment in the power and pantry cars, Technological Films on the Forward, Videos with the aforementioned subjects. **EMU/MEMU (Conventional & 3 Phase)** - introduction, Types of Conventional and 3 Phase EMU/MEMU, Layout and Operation of EMU Car Shed, Power, Auxiliary Circuit and Braking System of AC EMU/MEMU-Conventional & 3 Phase, Reliability and Performance of EMU & MEMU, Passenger Comfort Amenities, Metro Railway Systems Case Studies, quizzes, and videos pertaining to the aforementioned subjects **Traction Operations - TRO Organizational** Structure & Function of Individuals in TRO Organization, Personnel and motive power planning, crew link and loco link for crew management, training, supervision, and driver counselling. HOER and steps to decrease excessive working hours,

	CREW Utilization and measures to increase it, Safety Category, Road Learning, Personal Shops, Rest and Mileage Regulations, Mechanics of Traction: Adhesion, Tractive effort, etc. Security, G&SR with regard to Loco & Running Crew, Operations and Administration of the Trip Shed and Statistical Information, Statement 4-A, and Foot Plate Examination by TRO Officer. Information about Running Rooms, Other Subjects (GDR, Paper Line Clear, BPC, etc.), Sequential Process for Charging the Electric Locomotives, Case Studies, quizzes, and videos pertaining to the aforementioned subjects. **General Services - GS** Organizational structure, substation equipment, power factor improvement, general earthling concepts, earth resistance measurement, motors & energy conservation, water supply pumping installations, automation of pumps, lighting, and air conditioners, among other things, Window and package air conditioners, central air conditioning systems, cooling towers, water heaters, water coolers, and refrigerators, as well as maintenance schedules and procedures for transformers, substations, service buildings, circuit breakers, isolators, and fuses, among other items Maximum Demand, Tariff, Billing, Load Factor, Diversity Factor, etc. Case Studies, quizzes, and videos pertaining to the aforementioned subjects.
Phase II Course- This course will cover	Traction Rolling Stock - RS (Conv. Locomotives plus Three Phase Locomotive) - POH & MTR of Electric Locomotives, UES & Must Change Items, RSP, M&P, Bogie, Wheel and Axle, Traction Motor Maintenance, Seasonal (Monsoon, Winter, etc.) Precautions for

Advanced technology of Electrical Engg., Traction Rolling Stocks, Traction Distribution, Power Electronics, Coaching, EMU/MEMU, Traction operation, and General Services. (75 sessions)	Maintenance, Roller Bearings, fits & tolerances, Reliability and performance of Loco, Study of Failures and Scheduled Lifting, Fire Prevention in Locos, MSG items, ESC items, CELE's meeting, and Reliability Action Plan (RAP), modern advancements in locomotive technology, such as the Distributive Power Wireless Control System (DPWCS), GTO to IGBT Conversion, Propulsion System, Head On Generation (HOG), Push-Pull System, Cab Redundancy, etc. Key Safety Management Information systems (SMIs), TC & Modification Sheets published by RDSO, and software for managing locomotive repair, such as SLAM, RTIS, etc., Benchmarking and Maintenance Workers Yardstick, Location of the electric locomotive shed each morning. 14. Video Movies related to above topic and quiz. **Traction Distribution - TRD** -study of drawings, evaluation, justification, and execution of RE projects, Maintenance plan for a 25 kV traction substation protection scheme schedules for PSI and OHE Seasonal (Monsoon, Winter, etc) (Monsoon, Winter, etc.) precautions for upkeep, Regulatory authorities, open access, power forecasting & trading, SLDC, and other sorts of traction-tariff are examples of TRD brake downs. most recent TRD developments, 2x25kV system, High Reach OHE for DFC, OLIVIR-G, etc. MSG meeting materials SMIs & Technical Circulars Published by RDSO, Chief Electrical Design Engineer (CEDE) Conference, ESC Conference EIG's, Commissioning's, and CRS inspection's roles among others, PAT & SEC BEE life cycle,

	Equipment condition monitoring techniques, benchmarking, and staff maintenance standards, Senior DEEs' Morning Position each Day, Video Documentaries on the aforementioned subjects, Case Studies, and Tests. **Coaching (ICF + LHB Coaches Topics)** - Coach equipment failures and corrective action plan, Causes, treatments, and case studies of coach fires LHB Coaches - Depot upkeep, failure data downloads, manufacturing, and coach POH activities. Commissioning Test and Seasonal Special Repair (Monsoon, Winter, etc.) Maintenance precautions, the Reliability Action Plan and Rules Board Instructions, the MSG Meeting, CESE/CRSE Conference Items, the ESC Meeting, and significant SMIs and Modification papers issued by the RDSO, Notable developments include Vande Bharat, the GIS-based Passenger Information System, and the LHB SLR with Interlocking Panel. modifications made to the LHB coaches' pantry car, HOG, and push-pull operation, ICMS: Detention and Punctuality Monitoring, One Page Failure Report and Delogging note, GCC for Works and Services, DOs and DONTs of Works Contract, Arbitration and Vigilance Case Studies, Bench marking and Staff Yardstick for Maintenance, Daily Morning Position of Sr.DEEs in Division, Video Films related to above topics + Case Studies + Quizzes. **EMU/MEMU (Conventional & 3 Phase)** - Failure study of MSG and other significant meetings, EMU/MEMU (Conventional & 3 Phase), Daily EMU/MEMU position, benchmarking, and staff maintenance yardstick Video Documentaries on the aforementioned subjects, Case

	Studies, and Tests. **Green Energy - GE** SDG (Sustainable Definition Goal) Objectives & Targets, and Global Warming Electrical engineers' role in green energy, the most recent BEE directives, Building Code (ECBC), Solar PV System Design, Solar Water Heating System, Wind Energy System, Solar and Wind Energy Hybrid System, Newest Regulations, etc. Energy Conservation Star System, ISO Certification for 9001, 12001, 14001, 18001, and 50001, Renewable Energy, and Energy Conservation. 11. The following topics are covered in video clips, case studies, and tests. **Traction Operations - TRO**- Electrical and pneumatic loco troubleshooting, causes of and prevention measures for SPAD, Suggestions for effective engine management to prevent stalling, parting, and For conventional and three-phase locomotives, wheel-skidding, axle locking, and wheel floating Classification of accidents, Accident Inquiry & Management, CRS investigation, Line Haul Cost(LHC) calculation and controlling factors, Crew Review and Crew Review computation, CMS, FOIS, ICMS, etc. Methods for Energy Conservation in TRO, New Technology Progression in TRO, Section Control Chart of Division & WTT, Senior DEEs' Morning Position each Day, Case Studies, quizzes, and videos pertaining to the aforementioned subjects. **General Services - GS-** Distribution transformer and safety device failures. Electrical Fires in Stationary Installations: Causes and Prevention, I.E. Act, Rules, Energy Conservation Act, Energy Metering, Prepaid Meters & Smart Meters, Energy Efficient Lighting Technology &

	SCADA in General Services, Power Supply Management by Online Methods, Ring Main System, Power Line Crossing, Power Factor Improvement, and BEE Methodology for Energy Conservation. 8. Lifts and escalators, including their upkeep and applications like Rail Saver and EEMS. 10. Maintenance Benchmarking and Staff Yardstick, Senior DEE AM Role in Division, Case Studies, quizzes, and videos pertaining to the aforementioned subjects.

5.4 Training at IRIMEE

The detailed training at IRIMEE are made based on the training given to IRSME offices and discussions with IRSME officers. The training is designed for 8 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are the following-

Table 21. Detailed Curriculum of IRMS at IRIMEE

Course	Detailed Curriculum
C&W Module(30 sessions)	This Module includes- C&W organization, Type of coaches and identification, Coaches-System & Components, Rolling Stock Programme(RSP) and M&P program, LHB Shell Construction and its Furnishing items, ICF Shell Construction and repair, Train lighting system, Preventive maintenance C&W, Bogie Technology ICF, Bogie Technology LHB, Air Brake Technology and Brake Application, Recent development in maintenance infrastructure(

	Wheel Impact Load Detector(WILD), Online Monitoring of Rolling Stocks System(OMRS), Hot Axle box Hot Wheel detector(HAHW), Coach maintenance planning in the division, Recent development in coaches, Smart coaches, Water system of coaches, Air suspensions, Failure Indication cum Brake Application(FIBA), Wheel Slide Protection(WSP) and its working principle, Rail Wheel interaction, and Nadal's formula, Type of wagons and identification, CASNUB Bogie and its variant, Private Wagon maintenance, DFCCIL Project, Coupler technology in coaches & Wagons, Wagon-system & components, Preventive maintenance of wagons, Special purpose wagons (introduction & maintenance) , Bearing technology, Wagon body construction and repair, Smart Yard and next generation freight maintenance facility, Latest development in Wagons, Coaching Maintenance Module Portal, Freight Maintenance Module and FOIS, IREPS,User Depot Module ,iMMS.
Diesel Traction Module(30 sessions)	Role of Mechanical department, Introduction and basics of diesel locomotives, Air compressor & Air brake system in diesel locomotives, Lube oil system, Fuel oil system, cooling water system & forced charged system of High Horse Power(HHP) loco, Loco bogie arrangement, Tractive Effort and Adhesion, Micro Controller Based Governor(MCBG), Traction Control Convertor(TCC), Electrical Control Cabinet(ECC) & Control system of HHP diesel loco, HHP loco shed infrastructure and key management, Self Propelled Accident Relief Train(SPART)/Self PropelledARME/SPARMV transmission system and schedule

	management.
Train-set and DPRS Module(15 sessions)	Introduction to Train-sets, Train-set Bogie System, Train-set Maintenance schedules and infrastructure, Basics of Three-Phase traction technology, Mumbai Ahmadabad High-Speed Rail(MAHSR), Train Propulsion system, Train-set Air conditioning system, Train-set communication system, Conventional and 3-phase EMU, Urban rail transport, Train-set Brake system, Driver desk unit, EP Brakes, and High-speed rail technology.
Workshop Management(15 sessions)	working & Power Control Organization(PCO), Workshop, Workshop technical overview of activities & facilities in a C&W, Introduction to mechatronics, Electronic in-motion rail weighbridge, Material management in the workshop, Incentive Scheme(CLW pattern with case study), Incentive scheme(GIS Pattern with case study), Precision measurement and CTRB, Working with CNC Turning and Milling machines, Industry 4.0, Legal framework and safety in the workshop(with case study), Electrical Infrastructure in the workshop, Maintenance aspect of LHB Coaches, Management certification, Workshop Statistics, Portal, NTXR Examination, 100/180 day's failure analysis.
Disaster Management(15 sessions)	Derailment investigation, Accident manual overview, and its use, Accident Inquiries & Measurement at the accident site, New paradigm in accident investigation(5WHY Technique and Ishikawa diagram).
EnHM Module(15	Environmental Governance and regulatory framework, Plastic and E-waste Management, Sustainable Rail Transport, Introduction to EnHM of

sessions)	IR, Major contract of EnHM department, Environment compliance, Economic, Environmental, and Social impact of green initiatives, Solid waste management, Water Policy of IR, Management certifications.

5.9 Training at IRITM

The detailed training at IRITM is made based on the training given to IRTS offices and discussions with IRTS officers. The training is designed for 10 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 22.Detailed Curriculum of IRMS at IRITM

Course	Detailed Curriculum
Phase I Course- This will cover Train Operation(General Rule, Operating Manual &Accident Manual) and Commercial	**Commercials(Basics)** ● Organization at Divisional and Headquarters Level, Commercial staff, their Categories, Grades, Functions, and Promotional Channels. ● Computerization of Commercial Working **Booking Office** ● Types of Tickets and Passes/Permits, Season Tickets ● Unreserved Ticketing System – Issue, Cancellation, and Refund of Tickets

Management(Booking office, Reservation office, Ticket checking, Passenger amenities, Customer care, Courtesy, Public Grievances, Booking & Delivery of luggage and Goods Working)(75 sessions)	• Station Ticket Booking Sewak (STBS), Jansadharan Ticket Booking Sewak (JTBS) • Procurement of Tickets – Estimation, Indenting, Accountal, Record • Returns and Reports • Imprest Cash, Withdrawal from Station Earnings • Fare Calculation – Practical Exercises **Reservation office** • Passenger Reservation System – Reservation of Berths and Seats & Cancellation • Various types of Concessions and their Codes • Reservation Fee, Other Charges and Charting • Block Booking/Party Booking • e-Tickets and I-Tickets, Tatkal Tickets • Computerised Coaching Refund, Coaching Refund Rules • Special Powers/Functions of Chief Reservation Supervisor viz. Preponement and Postponement of Journey • Break Journey, Circular Journey • Change of Name, Boarding point, Reissue of Lost and Mutilated Tickets • Various types of Quotas – Primary and Sub-quotas, Passenger Profile Management • Facilities to Member of Parliaments(MPs), HOR (High Official Requisition)

	• Rules and Charges for Reservation of Compartments, Reservation of Special Coaches, Reservation of Bogies, Reservation of Special Trains and Tourist Cars by Party or IRCTC • Yatri Ticket Suvidha Kendra (YTSK) • Dynamic Pricing of Passenger Services **Ticket Checking** • Role, Function and Activities of Ticket Checking Staff • Object of Ticket Checking and Collection of Penalties and Other Charges, Various types of Checks: Ticketless Travelling • Cognizable and Non-cognizable Offences, Excess Fare Charge • Collection and Disposal of Tickets • Charge Sheet and Handing Over Memo, Guard Certificate **Passenger Amenities** • Policy guidelines for providing Passenger Amenities • Cleanliness in Train and Station, On Board Housekeeping Services (OBHS) • Augmentation of the existing Amenities and their maintenance and Service Improvement Group (SIG) Inspections • Model, Modern and World Class Stations • Retiring Rooms, Dormitories and Waiting Room, Online Booking of Retiring Rooms and Dormitories **Customer Care, Courtesy & Public Grievances**

	● Customer Care and Courtesy, Training of Staff ● Public Complaints, Redressal Mechanism ● Computerization of Complaints – Indian Railway Complaints Management System **Booking and Delivery of Luggage** ● Rules regarding Acceptance, Booking, Carriage and Delivery of Luggage ● Luggage Rate, Cloak Room and Locker Services and their Charges, Left Luggage **Booking, Conveyance and Delivery of Parcels** ● Rules regarding Acceptance, Booking, Carriage and Delivery ● Rationalisation of Rates for Parcel Traffic ● Parcel Management System (PMS) ● Tatkal Parcel Service, Leasing of VP, SLR and Parcel Express Trains **Goods Working** ● Rules regarding Registration, Acceptance, Booking, Weighment, Carriage and Delivery of Goods Traffic ● Risk Rates – Owner's Risk, Railway Risk ● Weighment and Re-weighment of consignments, Installation of Private Electronic in-motion Weighbridge ● Routing and Rating of Goods Traffic, Rationalized Routes ● Dynamic Pricing of Goods Services

	• Rebooking, Diversion, Transhipment of Consignments • Missing and Damaged Goods Report, Assessment of Damage Goods • Open and Assessment Delivery, Delivery on Indemnity Notes • Demurrage and Wharfage Charges, Waiver, Remission of Demurrage and Wharfage Charges • Goods Over Carried, Unconnected/ Missing Wagons/Consignments, Disposal of Unconnected and Unclaimed Consignments • Carriage of Railway Material and Stores • Duties of Commercial Staff during Accidents **OPERATIONS** • Organizational Structure at Division and HQ Level • Operating Staff, their Categories, Grades and Promotional Channels. **General Rules** • Preliminary (Chap. I) • Rules Applying to Railway Servants Generally (Chap. II) • Signals (Chap. III) • Working of Trains Generally (Chap. IV) • Control and Working of Stations (Chap. V) • Accidents and Unusual Occurrences (Chap. VI) • Systems of Working (Chap. VII)

	• Absolute Block Working (Chap. VIII) • The Automatic Block System (Chap. IX) • Following Train System (Chap. X) • Pilot Guard System (Chap. XI) • Train Staff and Ticket System (Chap. XII) • One Train Only System (Chap. XIII) • Block Working (Chap. XIV) • Permanent Way and Works (Chap. XV) • Level Crossing (Chap. XVI) • Working of Trains on Electrified Sections of Railways (Chap. XVII) • Rules and Regulation for Running of Trains during Interruption of Communication (Appendix B) • Special Instructions for Working of Trains on Absolute Block (Appendix D) • Working of Trains during Failure of Automatic Block System (Appendix E) • Standard Operating Forms (Appendix F) **Accident Manual** • Definitions and General Instruction (Chap. I) • Classification of Accidents and Officials to be Advised (Chap. II) • Reporting of Accidents (Chap. III) • Actions to be taken in case of Serious Accidents (Chap. IV) • Accident Inquiries (Cha. V)

	• Dealing with Cases of Sabotage or Train Wrecking (Chap. VI • Unusual Occurrences (Chap. VII) • Accident Records and Returns (Chap. VIII) **Operating Manual** • General Introduction to Transportation and Railway Operations (Chap. 1) • Working of Stations (Chap. 2) • Shunting (Chap. 4) • Station Working Rules and Traffic Working Orders (Chap. 5) • Advance Section and Ghat Rules (Chap. 6) • Loads of Trains (Chap. 8) • Train Papers (Chap. 9) • Stock Report (Chap. 10) • Block Rake (Chap. 11) • Movement of Over Dimensional Consignments and other Bulky Consignments (Chap. 12) • Marshalling (Chap. 13) • Marshalling Yards and their Working (Chap. 14) • Interchange of Rolling Stock (Chap. 15) • Passenger Train Operations (Chap. 16) • Freight Train Operations (Chap. 17) • Control Organization (Chap. 18) • Registration of Indents, Allotment and Supply of Goods Stock (Chap. 19)

	• Line Capacity and Throughput (Chap. 20) • Operating Statistics (Chap. 21) • Inspections (Chap. 22) • Running of Special Trains, Carriages, Reserved Coaches of Parties and Mela Traffic (Chap. 23) • Military Traffic (Chap. 25) • Interlocking • Close Circuit Movement • Practical : Block Room and Model Room Practical Hands–on-exercises
Phase II&III - This will cover Overall performance of Indian Railways, Freight Operation,Coaching Operation, Multi-modal Operation, Planning, Commercial,In	**OPERATIONS, COMMERCIAL & SAFETY** Overall Performance of Indian Railways **Freight Operations** • Heavy Haul Operations • Dedicated Freight Corridor • Traffic Indices - including Wagon Productivity, Loco Utilisation, FOIS (Application - Introduction), etc • Core Sector : Coal, Cement, Food Grains, Fertilizer, Steel & Iron Ore, POL • Divisional Crew and Power Plan : Crew Management – Recruitment of Crew, Availability and Productivity of Crew, Divisional Power Plan, Loco (Diesel/Electric) Maintenance

formation Technology, Safety & Disaster Management, Law, Vigilance, Audit & Miscellaneous(75 sessions)	Schedule • Inspections (1 sessions) **Coaching Operations** • High Speed Trains, Special Trains, Suvidha Trains • Suburban Train System, Metro Rail System • Coaching Stock – Assessment of Requirement/Demand, Planning and Maintenance, PPM analysis and Augmentation of Trains, Coach Booking by Private Parties – Haulage and Detention Charges • Railway Users Consultative Committee – NRUCC, ZRUCC, DRUCC, SRUCC • Indian Railway Conference Association – History, Organization, Functions and Publications • Timetabling including Platform Occupancy, Pit-line Occupancy • Punctuality • Halt Station Policy – Operation and Commercial Justification • Mela Traffic (Crowd Management) **Multi-modal Operations** • Container Logistics (CONCOR) • Ports • Shipping (including Coastal Shipping) • Road • Supply Chain Management

	• Warehousing, etc. (to be covered during CONCOR training) • Basic Custom Documents **Planning** • Why and What of Planning ? • Network Analysis & Existing Capacities • Traffic Volume - Future Planning & Prioritization • Overall Planning - Plan Heads (Works Programme), Traffic Facilities Works – Layout of Stations, Siding Plan, Engineering Plan, Passenger Amenities, Electrification, Metropolitan Projects, Staff Amenities, ROB/RUB • Execution Strategy - Knowledge (What is to be Executed. Why it is to be Executed), Budget for Execution, Strategy – Minimum Disturbance to Users, Safety During Execution • Manpower Planning including Vacancy Assessment & Filling - Operating Staff, Commercial Staff • Perspective Planning • Public Private Partnership (PPP) • Budgeting Exercise - Revenue Budget, Capital Budget (1 session) **Commercial** • Rating of Passenger and Goods Services : Introduction to Rates, Rates Organization, Passenger Tariff Structure, Freight Rates, Railway Rates Tribunal (RRT) • Freight Marketing : Policies, Siding Policy/Rules, Charges,

	Private Sidings, Guidelines for Construction of New Private/Assisted Sidings, Private Freight Terminal Policy • Types of Contracts, Earning Contracts, Expenditure Contracts, Service Contracts, Stages of Contracts, Development of Contract Document, Common Mistakes, Difficulties in and Solutions for Implementation of Contracts, e-tendering, e-procurement (Case Studies) • New Catering Policy, Catering Business on IR including Pantry Cars, Procedure for Allotment of Vending Stalls/Units, Role of IRCTC, Quality of Catering Services, Tour Packages, Budget Hotels, Tourist Trains and Rail Neer Plants • Railway Claims Tribunal Act, 1987, Power of Officers to Settle Claims, Railway Claims Tribunal – Organization, Jurisdiction, Functions and Powers • Cleanliness - Stations & Railway Premises, Outsourcing of Services and Contracts • Public Relations and Media Management • Commercial Publicity, Sundry Earnings, Commercial Leasing of Railway land, Bookstall Policy, Pay and Use Toilets • Earnings Estimates, Monitoring of Earnings & Clearance of Outstanding, Reconciliation Meeting, Apportioned Earnings – Case Studies • Demurrage and Wharfage - Waiver, Stacking Permission • Commercial Inspections – Objective, Frequency, Inspection

	Books and Reports, Important Areas for Inspection ● Weighment of Rakes ● Customer Care, Courtesy and Public Grievance Redressal (1 sessions) **Information Technology** ● Introduction of CRIS and various IT applications ● Freight Operation Information System (FOIS), Rake Management System (RMS), Terminal Management System (TMS), Terminal Pipeline Management System (TPMS), SFOORTI ● Integrated Coaching Management System (ICMS), National Train Enquiry System (NTES) ● Control Office Application (COA), RTIS, Crew Management System (CMS), Parcel Management System (PMS) ● SIMS, Data-logger, VCD ● Passenger Reservation System (PRS), Unreserved Ticketing System (UTS), Interactive Voice Response System (IVRS) ● Introduction of RBS & PPM ● e-ticketing, Hand Held Terminals and Mobile Ticketing ● Important mobile Apps launched by CRIS/IR ● IT Security **Safety & Disaster Management** ● IR Safety Organization/Setup, Recommendations of Different Committees

	• Chief Commissioner of Railway Safety (CCRS) Organization including Provisions in The Railways Act, 1989 • Handling of Serious Accidents including ART/ARMV Management • Accident Investigation and Inquiry including Important Readings to be taken at site of accident • Safety Inspections • Safety Action & Disaster Management Plan • New Development in Technology for Safety Enhancement : Automatic Train Protection System/Anti Collision Device/Train Collision Avoidance System (TCAS) • Introduction to Disaster and Types of Disasters • Disaster Management Act, 2005, Coordination with NDMA/NDRF • Emergency Medical Response Role of Traffic Officers During Rail Disaster • Lessons Learnt from Major Railway Disasters-Case Studies **Law** • The Railways Act, 1989 - Liability of Railway Administration for Death and Injury to Passengers Due to Accidents (Chap. XIII) and Untoward Accidents • Principles of Natural Justice • Right to Information Act, 2005 • Environment Laws (Legal Framework, Doctrines and Cases on

	Indian Railways) ● Indian Contract Act, 1872, Arbitration and Conciliation Act, 1996 (Statute and Cases on Indian Railways) ● Consumer Protection Act, 1986 (Statute and Cases on Indian Railways) ● Competition Act, 2002 (Statute and Cases on Indian Railways) **Vigilance** ● Structure & Role of Vigilance Organisation ● Conduct Rules, Handling of D&AR Cases ● Vigilance in Traffic : Prevention of Corruption ● Frauds and Embezzlements ● Vigilance Perspective on Contracts **Audit** ● Structure and Setup of Audit Organization of Indian Railways, Draft Paras, Audit Paras, Replies to Audit Paras, Audit Para Case Studies, Parliamentary Committee

5.10 Training at IRIFM

The detailed training at IRIFM are made based on the training given to IRAS offices and discussions with IRAS officers. The training is designed for 5 weeks including

Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 23. Detailed Curriculum of IRMS at IRIFM

Course	Detailed Curriculum
Finance & Accounting(75 sessions)	**General** Accounts and Finance Organization, Functions of Various Sections, Overview of Books and Budget, General Expenditure, Traffic Accounts, Workshop Accounts, Stores Accounts, Establishment rules, Structure of Railway Accounts, etc. Basic principles for Accounting for Managers and Concepts of Financial Management and Accounting Introduction to various Codes and Manuals, Data Analytics and Artificial Intelligence Office procedures and Types of Correspondence Interaction and Sharing of experience by Principal Financial Adviser(PFAs), Retired Financial Adviser & Chief Account Officer(FA&CAOs), Joint Secretaries working in other Ministries, State Government and other eminent personalities for Motivation and Guidance. **Training on "Traffic Accounts"** The Functions of Accounts and commercial department on earnings, Accountal of Traffic Receipts in Cash Office and TAO, E-Payment/ Online payments Earnings Budget Passenger Reservation System(PRS), Unreserved Ticketing System(UTS), Jansadharan Ticket Booking Sewak(JTBS), Station Ticket Booking Agent(STBA), Parcel Management System(PMS), Check and Accountal of Coaching Earnings including

	Balance Sheet, Check and Accountal of Goods Earnings including Balance Sheet, Accounts Office Balance Sheet, The Role of Travelling Inspector of Station Account(TIA) Traffic Suspense and Station Outstanding Communication of the results of Internal check in Traffic Account Officer(TAO) and its clearance, Possible Frauds in Traffic Matters and how to arrest them-Few Case studies. IRCTC the Linkage with IR, Traffic Book and Apportionment Freight Incentive schemes, New initiatives in Railway Budget, Gati Shakthi Terminals, Vande Bhart Trains, Multimodal connectivity, etc. Policy on Container Privatization (PFT), Interaction and Sharing of experience with Additional Member/Revenue /Railway Board, Director Finance DFCCIL, and other eminent personalities for Motivation and Guidance **Training on the "General Expenditure"** Works Program – Processing of Works Proposals through IRPSM, Parliamentary Control over Expenditure, Techniques of Financial Appraisal of Railway Projects, Establishment rules and processing of claims Scrutiny and Check of various Establishment Claims. Financial appraisal of Railway Projects under DCF Technique-Abstract Estimates for Construction Projects. Scrutiny of Detailed Estimates. Contracts General Principles including Special Conditions & GCC for Works and Services Types of Tenders, Pre-requisites of Tenders, Dispensation of Calling of Tenders, Direct Acceptance & Finalization of tenders by Tender Committee(TC) Scrutiny of Establishment Finance &

	OutSourcing of Non-Core activities proposals. Role and Responsibility of the Tender Committee and Accepting Authority. Dos and Don'ts Few Case studies. All about Variations in a Contract. Procedure for Tender finalization through IREPS & Contract Management through IR-WCMS. MSOP & Provisions of GFR, Manual of Procurement of Works, Control over Expenditure Arbitration in the Contracts – How to minimize the incidences of Claims and Awards. **Training on "Books and Budget"** Structure of Railway Accounts vis-à-vis Government Accounts, General Books and Subsidiary books, Accounts current- Monthly and Final- various schedules and their contents, Different types of Budgets, Performance Budget, Outcome Budget, and Zero-based Budget, etc. Compilation and Check of Revenue Budget at Railway Level - Special focus on the budgeting of POH and Fuel debits, Compilation and Check of Capital Budget at Railway Level. Compilation of Earnings Budget at Zonal Level, Role of Statutory Audit including Latest developments in Auditing like system-based Audit Latest C&AG report, Linkage of Revenue, Stores and WMS budgets, Parliamentary control on Railway Finances-Appropriation Accounts. Annual Accounts: Capital and Revenue Accounts, Finance Accounts including Debt head report. Railway Budget- various steps in formulation and presentation to Parliament. Highlights of Railway Budget 2022-23, Functions of Cash & Pay department- Journey of a rupee from station to RBI's CAS Nagpur including Door step

	banking. Remittance Transactions & Transfer-Transactions, Budgetary Control various Reviews, IPAS – Books Module - Issues in the working of the module, Important Activities of Books and Budget Sections-Role and responsibility of Accounts Officers, Budget in IPAS-New Developments in Budgeting, Accrual Accounting in IR Suspense Accounts, incl Half-yearly Review of Suspense Balances-Discussion on the Controller and Auditor of India(CAG) report on the review of suspense balances Expenditure Control and Exchequer Control, Internal Check and Internal Audit Pre-Check and Post Check. Indian Railways Efficiency parameters -Operating Ratio(OR), Performance Efficiency Index (PEI), Turn Over Ratio(TOR), Specific Fuel Consumption(SFC), etc. Rules of classification of Expenditure and Earnings. Costing, Budgeting and Accounting Process in Workshops and PUs **Phase Training on "Workshop and Stores Accounts"** Overview of Stores & Workshop Accounts in Indian Railways, Introduction to Stores Code Nomenclature of Stores - ABC Classification of Stores in IR importance, Issues and Receipts of Stock Items-Returned/Reclaimable items in Depots - Depot Management, Issues/Receipts from Workshops Returned/Reclaimable items, Inventory Management in IR – Developments Surplus Stocks, Sales, Scrap and Auction Sales, Priced Ledgers, Reconciliation Stores Suspense Balances-Purchase Suspense, Sales Suspense, and other Suspense Heads. Overview of Stores Finance, Scrutiny of Indents, Funds Register, Funds, Purchase &

	Advance, Grants, M&P and Rolling Stock Programme(RSP) IRS Conditions of Contract for Stores, intricacies in Stores Tenders, IREPS-Role of Members, Spot purchases, Stores Matters, Government E-Marketing, Passing of Stores Bills - Flow of work related to the bill passing linking IREPS, iMMS, and IPAS. Introduction to Rolling Stock Code/Mechanical Code Management & integration of iMMS, User Depot Module Manpower Planning in Workshops - Incentive Schemes Materials, Work order System, Workshop General Register(WGR), Out turn Statement. Stores and WMS Budget linkages. Introduction to New Technologies Advancements, Application software in the S&T Department, Zonal Railway Workshop working - Production Control-Out turn Activities On Costs, Costing of Workshop Activities, Job Costing System, Fuel Budget, Linkages with Revenue Demands Perspective in Preventive Vigilance, Fundamentals in Stores Tenders & Contracts Scrap Depots - Auction Sales - Managerial Reports Introduction of iMMS in IR/PU's - Implementation and challenges Workshop Manufacturing Suspense (WMS) Account, Compilation, Budget - Linkages with Revenue Demands Production units-Major Stores Tenders , finalization of Engineering stores Tenders for procurement of Track Items-IREPS Costing-Production Units and Workshops Stock verification -Results of Stock verification, Stores Matters-Latest developments **Training on Accounting, Financial Management & Macro Economics** Time Value of Money Capital Budgeting, National Income, Employment,

	Savings, Investment, Growth and development, Determinants of Demand, Supply & Price Fixation in an Economy. Importance of Price Working Capital Management Regulations and Subsidies in Emerging Economies, Inflation and trade cycles Fund Flow Statements Personal Taxation Cash Flow Statements Cyber security-Crimes

5.11 Training at Gati-Shakti University

The detailed training at Gati-Shakti university are made based on the training given to Railway officers and discussion with officers who are taking probationer training at Vadodara. The training is designed for 8 weeks including Ethics training. Every day is of three sessions of two hours each which include theoretical as well as practical training. The details are following-

Table 24. Detailed Curriculum of IRMS at Gait-Shakti University

Course	Detailed Curriculum
Management Training	This will cover Finance Accounting, Organizational Behaviour, Transport Economics, Marketing Management, Marketing Research, Big Data Analytics, Operation Research, Human Research Management, Strategic Management, Macro-Economic & Business Environment, Supply Chain Management & Logistic Management

5.12 Field Training at Various Railway Units

Table 25. Detailed Curriculum of IRMS in Fields

Field unit	Training Detail
Any one of the Loco manufacturing units BLW or CLW	• Organization and functioning of all the departments working in BLW/CLW. • System of work order, rolling stock program, and latest product mix for manufacturing of various types of locomotives.(Dy. CEE/PLG) • Welder qualification at TTS, BLW (Principal Technical Training Center(TTC)) • Procedure for bulk import indent of diesel spares and procurement and supply of other BIM items • Recent development in Electric/diesel locomotives. (Chief Design Engineer(CDE)) • Special features of new types of locomotives. (CDE) • Study and understand the flow chart of locomotive assembly. (Chief Electrical Engineer(CEE)/Loco) • Study of various processes of manufacturing in shops. (CEE/LOCO&Chief Mechanical Engineer(CME)/P) • Engine testing and inspection. (CEE/Inspection) • Locomotive testing and inspection. (CEE/Inspection) • Understanding of various inspection checklists. (CEE/Inspection) • Marketing organization of BLW (CME/P)

	• Machine commissioning and maintenance (CME/SE) • BLW/CLW Vendor Directory (CDE) • Maintenance of Machinery and Plant in BLW (CME/SE) • Manufacture of electrical harnesses, cutting diagrams (CEE/LOCO**)**
Any one of the Coach/EMU/ Train Set manufacturing units like ICF/MCF/RCF	• Production Flow – Plant layout, various stages of manufacturing of the coaches. • Study important manufacturing techniques, Machinery& Plant, and Jigs such as Underwater plasma cutting machines, Cold Roll forming and cut-to-length machines, Laser FMC (Flexible Machine Centre), Plasma Punch Press, CNC Pipe Bending Machines, Roll bending machines, 1000 ton press, CNC Press Brakes, Welding Robots, 3-D Co-ordinate Measuring Machine, Automated Painting system for shell painting including surface preparation, Material Handling Equipment, CNC Auto-stacker system, Remote Control – Overhead cranes, Rail-Cum Road Vehicle, Rolba(Vacuum Shop cleaning with scrubbers), Parallelization, Traversal, Important Jigs such as under frame, Side Wall, Roof, bogie frame, bogie side frame, Shell Assembly jig, bogie testing, butt-seam welding machine, etc. • Study how the full set of drawings for a type of coach is organized. Study the drawing numbering scheme for various components and assemblies and understand the logic. Practice identifying the location of a component just by looking at the drawing number.

	Discuss the common points and differences as well as advantages and disadvantages between the system of drawings prepared by ICF and RCF. ● What are the various considerations kept in mind by designers while developing new drawings? Discuss these with specific examples. ● What is the procedure for a design change? How is a new design evaluated/tested? ● How is the Bill of Materials (BOM) prepared for each type of coach? How is the way in which drawings are numbered related to the development of a BOM? How are decisions for "make" or "buy" taken? How is the production plan translated to a material procurement plan? What is the role of "common items"? ● How is productivity measured? How is shop capacity measured? Are there any trends with respect to productivity ratings? If yes, then what are the reasons for such trends? ● How is the scheduled maintenance of M&P planned? How is the out turn managed while the machine is under maintenance? ● What are the different types of welding methods used for coach manufacture? Why are so many types of welding methods required? What are the specific advantages of using each particular method for a specific purpose? ● Identify the various parts of a welding set and welding torch? What types of shielding glasses are used by welders to protect their

	eyes? How are these graded? ● What is the personal protective equipment prescribed for different categories of workers? How effective are these measures? ● Study the list of approved vendors issued by RCF? What is the procedure for the approval of vendors? ● Study the design aspects of Linke Hofmann Busch(LHB) and Train-18 coaches. ● Study of various aspects of Railway passenger coach designs – conventional and special stock – what are the salient features of „integral design"? ● Study the salient design features of metro coaches, what are the common and uncommon points with respect to ICF (EMU/DEMU) coaches? ● Study the design aspects of air brakes in EMU coaches. ● Study the coil spring manufacturing process at ICF. What are the various steps taken to ensure quality? How are springs tested? Understand the marking scheme on springs. ● What are the various stages of Coach furnishing? How are the activities of the Electrical and Mechanical Departments coordinated in the furnishing shop? ● What are the various types of Self Propelled Vehicles manufactured by ICF? Prepare a detailed report describing the salient features of these vehicles. From where are the control systems and propulsion systems for these vehicles sourced? How

	are these assembled on the various cars? ● What are the activities carried through works contracts inside ICF? What is the procedure adopted for such contracts? How is the quantity and quality of work carried out in such contracts measured? ● Study the various activities of the Quality and Inspection wing? What is their role in the inspection of shop manufactured items/assemblies, bought-out items, and works carried out through works contract? ● What are the various Non-destructive and destructive tests carried out on welding joints? ● What is the procedure to test the quality of paints, rubber items, steel and lubricants, electroplated items, plywood, seats, and berths, etc.? ● Study the working of the Electrical Design Office. What are the various activities carried out there? How do the Electrical and Mechanical Design offices coordinate with each other? ● Study the list of approved vendors issued by ICF? What is the procedure for the approval of vendors? ● Study the design aspects of EMU/MEMU coaches. ● What are the different types of welding methods used for coach manufacture? Why are so many types of welding methods required? What are the specific advantages of using each particular method for a specific purpose?

	• Identify the various parts of a welding set and welding torch? What types of shielding glasses are used by welders to protect their eyes? How are these graded? • What is the personal protective equipment prescribed for different categories of workers? How effective are these measures?
Division Visit to understand the working of all the department	• Organizational Structure • Stretch of the Division and Interchange points • Study Working time table and also see the additional information given about division and technical instructions • Interchange and forecast • Various Controls and their roles • Crew changing points and C&W examination points • Break down gangs available and their equipment • Location of Tower car sheds • Unusual reporting to Headquarter and DRM • Punctuality loss cases, their analysis and reporting • Delogging of the cases not acceptable by ADRM • Performance Indices of Division and their status • Morning position of Branch officer and DRM • Various Goods sheds and loading/unloading points • Visit of loading and unloading points to see damage to wagons and other activities during process • Budgeting exercise at Division for revenue and Demand 16 • Bill passing and fund allocation

	• Works Contract processing at division • Vacancy position and process to fill up by Promotion/selection • Zonal contracts of Engineering department • Crew link, Loco link, Rake link • Power plan and exercise of sanction of crew • Status of Works program, M&P Program and Rolling stock program • Role of control offices. • Control chart: Ideal time, actual chart, statutory train • Engine utilization calculation, Goods loco movement • Specific Fuel Consumption calculated by Statistical Section of HQ • Overdue schedule monitoring and movement • Invalid Brake Power Certificate(BPC) trains • Enroute attention to trains as per rake link i.e. Watering, Cleaning, Rolling in Examination, Engine changing/reversal • P.way maintenance activities. • Trip maintenance shed working • Observe Rolling In Examination and Engine Changing/Reversal • Outage calculation and observe how high outage results in crew shortage • Movement of Overdue/dead loco • Traffic block • Station working • Emergency working as Single line working in double line section,

	Signal failure, Communication failure, etc. ● 140T Crane working in Mainline in bridge working or Accident. Time required for setting/de-setting ● Outstanding Audit Cases and Paras ● Outstanding Stock sheets ● Pending Annual Performance Appraisal Report(APARs) ● Accident Enquiries and statistics of responsibility ● Awarding the outstanding employees in Minister of Railway(MR), GM, Chief Mechanical Engineer(CME), DRM, Chief Operating Manager(COM), and Safety.
Zonal HQ Visit to understand the working of all the departments	During the zonal training probationers undergo thorough training covering the following areas: ● HeadQuarter working of all the departments, meeting with all the heads of departments and their sub-head ● coordination activities with all divisions, ● working of zonal control offices, Crew Lobby, Running Room. ● foot plate inspection, Railway Consumer Depot, Weighbridges, Wheel Impact Load Detector, Accident Relief Train(ART)/Accident Relief Medical Equipment(ARME)/CRANE, etc. ● Zonal hospital visit ● Coaching Depot/EMU shed management and maintenance practices. Freight Depot and examination yard management and maintenance practices. Electric/Diesel Shed management and

	maintenance practices. Workshops pertaining to the zone. ● On-the-job training in the zone. Any other area nominated by the zone.
Research Design and Standard Organization(RDSO) Visit	Organizational structure, Role, and understanding of each directorate functioning, meeting with DG and all the directorate head, visit to all the Labs.
EMU/MEMU/ DEMU shed visit	● Organization structure of the Mechanical Department of the DEMU/EMU Shed. ● Holding of rakes (type wise) ● Depot morning position. The information in these positions and their relevance in the day-to-day management of the depot should be understood thoroughly. ● Technical parameters of DEMU/EMU Power car ● SFC and Lube oil Consumption calculation in shed ● Pareto Analysis of loss of punctuality, Sick marking, en En-route detachment. ● Pit occupation chart. Planning in case the train arrives late. ● Layout of DEMU Shed. ● Any difficulty faced by maintenance staff during Pit examination. ● Procedure of sending rakes for POH.

	• Rolling in Examination and Axle box temperature recording • Distribution and function of the batch. • Any unsafe working as Nonprotection of line, shunting during working, etc. • Types of Repairing done. • Various schedules of DEMU Power car and trailing car. • Plants and equipment availability and adequacy • Infrastructure facilities available and their adequacy Pit-lines, Lifting bay, Staff rooms, toilet for staff, Stores, Water storage, etc. • Important Gauges and tools used and their working. • Schedule maintenance of DEMU power car and trailing car. Calculation of Arising of POH, Intermediate Over Hauling(IOH), and other schedules. • Schedule forms of various schedules. • Rake links. • Works Contracts being operated in DEMU shed. • Measurement of Work done by Contractors • Penalty Clauses of Contracts • Cleanliness and Housekeeping of Shed • Battery Charging line • Components of Electrical Items in Power car and trailing car • Any induction of Bio-diesel power car or Liquid Petroleum Gas/Liquid Natural Gas power car.

	• Study the system for maintenance of coach history cards and forecast of Maintenance. • Synchronization of all maintenance activities i.e. trailing car POH, a heavy schedule of the engine and its assembly, traction electrical system, hydraulic system, etc
Electric Shed/Diesel Shed Visit	• Organization Chart and Shed Layout • Power Plan, Outage and other Shed Performance statistics. Considerations to be kept in mind while preparing Loco Links. • Study schedule forms for Minor & Medium schedules (Mech. & Elect.), and method of forecasting and planning their schedules. • Study the History Cards of locomotives and the method of forecasting and planning their schedules and how components such as turbochargers, radiator cores, traction motors, governors, alternators, transformers, propulsion systems, etc. are tracked over their lifetime across locomotives. • Check a locomotive thoroughly in the pit. Inspect oil level/Cardium compound level in gear cases. How is the topping-up done? How is the lube oil level checked? How is the topping-up done? How is the quantity topped up on each locomotive accounted for? • Check the sanding gear of a locomotive? How is the quality of sand being ensured? Inspect the room where sand is stored. How is ensured that sand is moisture free? Carry out a sieve test for the

	sand. ● Observe the air-brake testing of a locomotive during the light schedule. ● Observe how the safety devices in the locomotive are tested (Headlight, horn, flasher light, auto flasher, etc,). ● Does the shed have a set of activities for summer precautions, and monsoon precautions? What about winter precautions (Cardium compound hardening)? What are the additional activities/checks carried out as part of these precautions? When are these drives initiated? Are they completed in time? How is the progress monitored? ● M24 Schedule – details of activities, their Programme Evaluation Review Technique(PERT) chart, and execution. ● Attend one shift each (light schedule) with the shift in charge (M), and shift in charge (E) and observe their working. Observe load box test of loco after major schedule and study the records, plot control chart for some important characteristics. Identify the preparatory activities to be carried out before conducting a load box test after the locomotive has undergone a major maintenance schedule (M24 or higher). Find out why a water load box type arrangement is not required for an HHP Locomotive. ● Study and observe the complete failure investigation of a locomotive. Carry out the analysis as follows for the last two years: Maintenance Section-wise failure trend, sub-assembly-wise,

	responsibility-wise (i.e. bad work by the shed, materials, bad work by the shop, mismanagement by the crew, etc.). Identify problem areas. ● Study the availability of staff, infrastructure, and M&P items in the shed and their adequacy. ● Study the system of receipt & issue of fuel oil and the details of various monthly statements sent to HQ. Personally carry out a verification of the fuel oil dip reading in the various storage tanks. Find out the procedure followed for writing off of shortage in fuel detected during stock verification. ● Study the calculation of Specific Fuel Consumption(S.F.C) (Loco wise & service wise) and shed consumption. ● How does the shed monitor consumption of lube oil? What parameters are watched for this purpose? ● Study the system of monitoring of loco cooling water, lube oil, etc. by the lab. What tests are being carried out? How long do these tests take? How is it ensured that locomotives identified with problems by the lab are attended to before being sent for traffic? Is the feedback from the lab timely? ● Study schedule forms for various minor & medium schedules (Mech. & Elect.) ● Attend various maintenance sections (Mech. & Elect.) – Study Maintenance Instructions(M.I.s) for the section and observe details of various checks and measurements.

	• Visit the battery section. How are new batteries charged? What is the cycle followed? How much life is obtained from locomotive batteries? What safety precautions are followed by staff while handling acid? • Study the system of drawl of items from Stores and their account. • Study the systems of procurement of various types of items (Imprest, stock & Nonstock). Study the system of coordination between the Stores officer and the Mechanical/electrical Officers of the Shed. Note down the process followed for the recoupment of Stock Items by the Stores depot attached to the shed. How changes in specifications, quantity required, etc. are communicated to the Stores department? Is it effective? Study the Material Management Information System (MMIS) of the store's department in detail. What is the useful information that can be obtained from the MMIS? Is the Material Cell under Sr.DME/Sr DEE exploiting all the features of MMIS effectively? Study the items reported to have nil/low stock to headquarters. Is there a pattern to these items (eg. BLW/CLW items, Imported items, etc.). Why has the crisis occurred? What steps have been taken to overcome the crisis? • Facilities – Infrastructure, staff, training, and M&P items – available and required. E.g. cranes, pit wheel lathes, drop pits, compressors, forklift trucks, battery-operated trucks, spectrographs, etc. How are these being maintained?

	• Technical Cell – History cards, failure investigation, schedule planning, performance indices, technical instructions. • Among the locomotives under repair in the shed, which has been in the shed for the longest duration? When is it likely to be released for traffic? Is the delay abnormal? If yes, what is the reason for the delay? • What is the procedure for attending to locomotives involved in accidents? What type of repairs are carried out in the shed and for what type of repairs is it sent to the workshop? • How does the shed tackle locomotives with "locked axle" in an open line? What tools are carried for attending these locos? Is there sufficient staff who can attend to such emergencies? • How does the shed discharge its effluents? Is there an Effluent Treatment Plant (ETP)? How is it ensured that the effluents discharged meet the norms of the Pollution Control Board? • How does the shed dispose of hazardous waste such as oil-soaked filters, used fibreglass filters, condemned lead acid batteries, condemned composite brake blocks etc.? Are these items kept well segregated in the scrap yard? Is there contamination of land by way of seepage of oil/acid etc?
Station + Traction Distribution Visit	• This field visit will impart the understanding of Station working and maintenance of all the assets related to the station. This visit is required to check the maintenance schedule of points and signalling systems.

	• This visit also made the probationer understand the maintenance of the Substation of traction distribution.
NHSRCL Visit	• Organizational Structure • Overview of different projects, Field visit of different sites of Mumbai-Ahmadabad High-Speed Rail Corridor. • Understanding of Rolling stocks procurement and future manufacturing through atma nirbhar bharat. • Understand the challenges of the project.
Japan High Speed Rail Visit	This field training is required to understand the Japan High-speed rail system - This includes the following contents- • The concept of "punctuality/on time", which is a central policy of Japan's high-speed rails, was conveyed to the Indian trainees, who were instructed in the importance of punctuality as part of the training. • Characteristics of Japan's high-speed railways, Safety management, Station development and transportation nodes • Training centers working, rolling stock centers, command centers, terminal stations, railway museums, rolling stock manufacturers, other manufacturers of railway-related equipment
DMRC Visit	Understanding of organizational structure and its functioning, visiting its maintenance and other facilities to understand its service delivery and challenges
PSU Visit	Understanding of organizational structure and its functioning, visiting its

	maintenance and other facilities to understand its service delivery and challenges

In above table of this chapter all the details of subjects under each module are prescribed. All the training modules of different institutes(NAIR, IRIMEE, IRITM, IRICEN, IRIEEN, IRISET, IRIFM & GATI-SHAKTI UNIVERSITY) detailing have been done point-wise so that they can easily be read. The detailed curriculum has taken care of all the theoretical and practical part of the subject. The total no of sessions is 1560. Each session is of two hours. The Quality of the curriculum is ensured based on the different institute expert suggestions. This holistic detailed curriculum will lead Indian Railway in Amrit Kaal to the expectation of our Prime Minister in the next twenty-five years.

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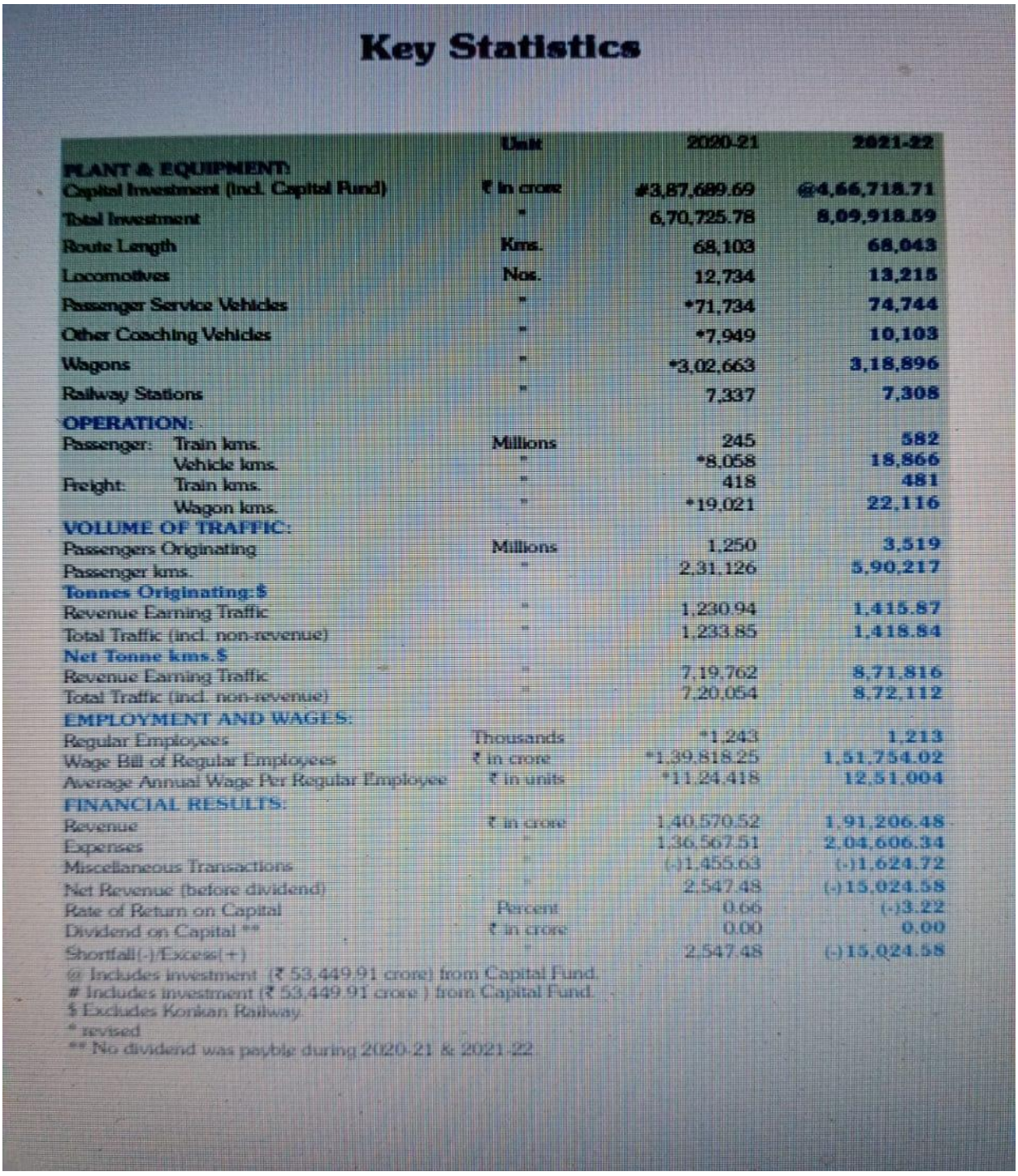
Annexure

With Reference to Statistics used in the introduction .



Key Statistics

	Unit	2020-21	2021-22
PLANT & EQUIPMENT:			
Capital Investment (Incl. Capital Fund)	₹ in crore	#3,87,689.69	@4,66,718.71
Total Investment	"	6,70,725.78	8,09,918.59
Route Length	Kms.	68,103	68,043
Locomotives	Nos.	12,734	13,215
Passenger Service Vehicles	"	*71,734	74,744
Other Coaching Vehicles	"	*7,949	10,103
Wagons	"	*3,02,663	3,18,896
Railway Stations	"	7,337	7,308
OPERATION:			
Passenger: Train kms.	Millions	245	582
Vehicle kms.	"	*8,058	18,866
Freight: Train kms.	"	418	481
Wagon kms.	"	*19,021	22,116
VOLUME OF TRAFFIC:			
Passengers Originating	Millions	1,250	3,519
Passenger kms.	"	2,31,126	5,90,217
Tonnes Originating:$			
Revenue Earning Traffic	"	1,230.94	1,415.87
Total Traffic (incl. non-revenue)	"	1,233.85	1,418.84
Net Tonne kms.$			
Revenue Earning Traffic	"	7,19,762	8,71,816
Total Traffic (incl. non-revenue)	"	7,20,054	8,72,112
EMPLOYMENT AND WAGES:			
Regular Employees	Thousands	*1,243	1,213
Wage Bill of Regular Employees	₹ in crore	*1,39,818.25	1,51,754.02
Average Annual Wage Per Regular Employee	₹ in units	*11,24,418	12,51,004
FINANCIAL RESULTS:			
Revenue	₹ in crore	1,40,570.52	1,91,206.48
Expenses	"	1,36,567.51	2,04,606.34
Miscellaneous Transactions	"	(-)1,455.63	(-)1,624.72
Net Revenue (before dividend)	"	2,547.48	(-)15,024.58
Rate of Return on Capital	Percent	0.66	(-)3.22
Dividend on Capital **	₹ in crore	0.00	0.00
Shortfall(-)/Excess(+)	"	2,547.48	(-)15,024.58

@ Includes investment (₹ 53,449.91 crore) from Capital Fund.
# Includes investment (₹ 53,449.91 crore) from Capital Fund.
$ Excludes Konkan Railway
* revised
** No dividend was payble during 2020-21 & 2021-22

Other Important Statistics

S.No.	Item	Unit	2020-21	2021-22
I	**Rail Network**			
1	Route Kilometres			
	(i) BG	Kms.	64,403	65,093
	(ii) MG	"	2,112	1,655
	(iii) NG	"	1,588	1,294
	(iv) Total (all gauges)	"	68,103	68,043
2	Running Track Kilometres (Total all gauges)	"	1,00,866	1,02,831
3	Total Track Kilometres (Total all gauges)	"	1,26,611	1,28,305
4	Electrified Route Kilometre (Total all gauges)	"	44,802	50,394
II	**Rolling stock**			
1	Number of Locomotives	(in units)		
	(i) Steam	"	39	39
	(ii) Diesel	"	5,108	4,747
	(iii) Electric	"	7,587	8,429
	(iv) Total	"	12,734	13,215
2	Number of Wagons	"	3,02,624	3,18,896
3	Number of Coaches-	(in units)		
	(i) Passenger Carriages (including DEMU/ DHMU)	"	*60,743	62,971
	(ii) Other Coaching Vehicles	"	*7,949	10,103
	(iii) EMU and MEMU Coaches	"	10,991	11,773
	(iv) Rail Cars	"	*18	16
	(v) Total	"	*79,701	84,863
III	**Loco Utilisation**			
1	Tractive effort per loco			
	(i) BG	Kgs.	39,911	40,553
	(ii) MG	"	16,439	16,053
2	GTKMs (excl. wt. of engine & dept.) per kg. of tractive effort.			
	(i) BG	Kms.	2,713	3,697
	(ii) MG	"	*32	165
3	Engine kilometres per day per engine in use (Pass.) (B.G)			
	(i) Diesel	Kms.	*493	703
	(ii) Electric	"	*678	747