



**Government of India (Bharat Sarkar)
Ministry of Railways (Rail Mantralaya)
(Railway Board)**

No. E(MPP)2019/3/50

**RBE No. 42/2020
New Delhi, Dated 05.06.2020**

**The General Managers,
All Indian Railways/PUs,
Metro Railway/Kolkata
Railway Electrification/Allahabad
DG/RDSO/Lucknow
CAO/DMW/Patiala
CAO/COFMOW/New Delhi
ED/CAMTECH/Gwalior**

**DG/NAIR/Vadodara
The Directors,
IRITM/Lucknow
IRIEEN/Nasik
IRIMEE/Jamalpur
IRICEN/Pune
IRISET/Secunderabad**

**Sub: Revised Training Modules of Non-Gazetted Staff of Signal
& Telecommunication Department.**

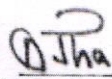
**Ref: Chairman/Railway Board's letter No. E(MPP)/2016/3/20
dated 28.11.2018 and Board's letter dated 06.12.2018**

Vide Board (CRB) letter No. E(MPP)/2016/3/20 dated 28.11.2018, DG/NAIR had been authorized as the Head of the Academic Council of all CTIs to develop Training Modules of all categories of Non-Gazetted staff. Accordingly, training modules of Signal & Telecommunication Department were finalized and sent to this office.

2. Ministry of Railways (Railway Board) has reviewed the above Training Modules proposed and submitted by DG/NAIR. Board (Member/S&T & MS) has approved the revised training modules.

3. The revised modules prepared have been scanned and uploaded under **E(MPP) Training Circulars** and can be viewed or downloaded from **railnet**.

4. Kindly acknowledge receipt.


**(Ajay Jha)
Jt Director/MPP
Railway Board.**

Copy to:

- 1) The General Secretary, NFIR, 3 Chelmsford Road, New Delhi for information.
(Copies may be downloaded from E(MPP) Training Circulars/Railnet)
- 2) The General Secretary, AIRF, 4 State Entry Road, New Delhi for information.
(Copies may be downloaded from E(MPP) Training Circulars/Railnet)
- 3) The Secretary General, FROA, R.No.256-A, Rail Bhavan, New Delhi for information.
(Copies may be downloaded from E(MPP) Training Circulars/Railnet)
- 4) The Secretary General, IRPOF, R.No.268, Rail Bhavan, New Delhi for information.
(Copies may be downloaded from E(MPP) Training Circulars/Railnet).
- 5) All Members, Department Council & Secretary Staff side National Council 13-C, Ferozeshah Road, New Delhi. (Copies may be downloaded from E(MPP) Training Circulars/Railnet)
- 6) The Secretary General, AIRPF Association, Room No.256-D, Rail Bhavan, New Delhi. (Copies may be downloaded from E(MPP) Training Circulars/Railnet)
- 7) General Secretary, All India SC & ST Railway Employees Association, 171/B-3, Basant Lane Railway Colony, New Delhi. (Copies may be downloaded from E(MPP) Training Circulars/Railnet).



For Secretary/Railway Board.

No.E(MPP)2019/3/50

New Delhi, dated: 05-06-2020

Copy to:

- i) PS & ED(PG) to MR, MSR(A) & MSR(K)
- ii) PSO/Sr.PPS to CRB, FC, ML, ME, MM, MS, MT, DG(RHS) & DG(RPF)
- iii) Sr.PPS/PPS/PS to AM(Budget), AM(CE), AM(C&IS), AM (Comml.), AM(Elect), AM(Fin), AM(Mech.), AM(Plg.), AM(Project), AM(PU), AM(Sig.), AM(Staff), AM(RS), AM(T&C), AM(Tele), AM(Traffic), AM(Works), Adv.L (RS), Adv(Vig.), Adv.Fin (Exp), Adv(IR), Adv(Safety), LA, OSD(MIS).
- iv) ED(Plg.), ED(Accts.), EDF(BC), EDCE(B&S), EDCE(G), EDCE(Plg.), ED(CHG), ED(CC), ED(C&IS), ED(E&R), EDEE(Dev), EDEE(G), EDE, ED(RRB), EDE(N), EDE(Res), EDF, EDF€, EDF(S), EDF(B), EDF(RM), EDF(X)I, EDF(X)II, ED(H), EDLM, ED(MIS), EDE(GC), ED(T&MPP), EDME(Chg.), EDME(Fr.), EDME(Tr.), EDME(TOT), EDME(Dev.), EDME(W), ED(PC)I, ED(PC)II, ED(PP), ED(Project), ED(Project)/DMRC, EDRE, ED(Safety), JS, JS(C), JS€, JS(P), IG./RPF(Hqs), IG/RS, ED(S9g.), ED(Stat & Econ.), EDRS(C), EDRS(G), EDRS(P), EDRS(S), EDRS(W), ED(TD), EDTT(M), EDT(MC), EDT(P), ED(T&C), EDCE(P), ED(PM), ED(PG), EDTC-I, EDTC(FM), EDTT(F), EDTT(FM), EDTT(S), EDV(A), EDVE, EDV(T), ED(W).
- v) Chief Commissioner of Railway Safety, Lucknow.
- vi) E(Trg.), E(NG)I, E(NG)II, E(G), F(E)I, F(E)II, F(E)III, E(SCT)I, E(SCT)II branches of Railway Board.



TRAINING MODULES
FOR GROUP “C” & “D” STAFF
OF S&T DEPARTMENT

**Indian Railways Institute of
Signal Engineering &
Telecommunications/Secunderabad**

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

VERSION HISTORY

(Version-3.0)

SN	Module Prepared for	Name	Signature	Date
1	JE/SSE –Signal	Sri K.V.Reddy, Sr Prof/Sig/IRISET		
2	JE/SSE –Telecom	Sri C.Chandrasekhara Sastry Sr Prof/Tele/IRISET		
3	Technicians & Group D staff	Sri U.Sampath Kumar Principal S&T Training Centre / Moulali/ Secunderabad		
4	Compilation	Sri C. Neelakanta Reddy Sr Prof/Trg/IRISET & Sri Vivek Chakraverty Asst.Professor/Trg/IRISET		
5	Scrutiny	(Sri Ch.Mohan) Director/IRISET		
6	Recommended	(Sri S.P.S.Chauhan) DG /NAIR		
7	Approved	(Sri Pradeep Kumar) MST/Railway Board		

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PREAMBLE

This booklet is for mandatory courses (Initial, Refresher, Foundation) for Supervisors, Technicians and erstwhile Gr D staff of S&T Department. Key features are as under.

1. Both Institutional & Zonal Railways Training Periods & Marks have been prescribed. Approx. 1/3rd of Total marks have been allocated for Zonal training. Training Managers of Zonal Railway may decide contents for field training and evaluate as per specific requirements of each Railway.
2. The CD (Course Director) spare hours have been catered (@1.5 hrs/week) to cater for holidays/extra classes/Local visits/ etc for all categories.
3. Trainees shall be engaged in Shramdaan/Rain Water Harvesting/ Gardening /Swatch Bharat/any other social service for at least 2 hrs/week to inculcate service to society, to bring awareness about cleanliness.
4. In accordance with the prevalent practices in reputed academic institutions to reward good behaviour of Trainees both in Class Room & Hostels and to encourage them to participate actively in Swatch Bharat/Socio-Cultural /Shramdaan/Library/Garden activities, marks have been allocated (approx @ 10% of Total marks). Though these marks will not have any bearing on result as pass or fail, these marks shall be considered for merit list. Course Director (CD) will assess each Trainee as per Details given in Annexure-3.
5. Theory Exams of all Initial Courses will be of subjective (60%) and objective (40%). Refresher courses will have subjective (30%) and objective (70%) as per extent practice. Subjects may be grouped for examination. Pass mark is required for each subject in a group.
6. Initial course for Promotee JE (Intermediate) will be conducted at IRISSET for trainees selected through 20% LDCE Quota. Same content may be followed for the trainees selected through 40% quota at respective STTC of Zonal Railway.
7. Refresher Courses for signal & telecom Supervisors and Technicians shall be at 4 year interval. Refresher course for Helpers shall be at an interval of 5 years.
8. In case where few SSE's are reporting for training, their course will be merged with that of JE/Signal.
9. The marks for Project Presentation are only for supervisors and not for Technicians & Helpers (Erstwhile Group D).
10. There is no direct recruitment to Technician (Tele) Gr I. Hence, no module has been specified for the same.

11. Working Days for IRISSET are five days a week while STTC are six days a week and both have 6 hrs per day.
12. Yoga, Personality Development programs, ethics, healthy food habits, meditation program shall be organised for stress management either during working hours or extra hrs beyond class timings on weekends as feasible. When such courses are organised through outside organisation the cost to be paid to such organisation shall be paid by trainee, where it cannot be funded by Institute.
13. An oath shall be administered to all trainees before passing out of course that they shall not allow/support short cut methods, shall work ethically, amicably with all others.
14. Subject wise hours are specified as a general guideline. The training Institutes may specify detailed syllabus/Content as per the technology/equipment/best practices /Evolving needs. Trade off between one subject to another is at the discretion of Institute. (viz: For obsolete subjects to Latest Subjects) without changing duration of course. When there are less number of trainees in a particular course, they may be merged with another similar course at the discretion of Institute.
15. A list of subject codes of IRISSET & STTC are given in Annexure-1.
16. Course Content for Training Modules of Group “C” Technicians & Erstwhile Group “D” Staff of S&T Department is given as Annexure-2.
17. Topics on Establishment, Stores, Signal Engineering Manual, Telecom Manual, G&SR is included as ST65 at page no 153 for inclusion in other courses where the STTC deems fit.

Course Codes used	Course Name	Institutional Training at
ISSE	Initial Course For App SSE (Signal)	IRISSET
ISJE	Initial Course For App JE (Signal)	IRISSET
IDSJE	Initial Course For App SSE/JE (Design)	IRISSET
ISPJE	Initial Course For Promoted JE/Signal-(Intermediate) 20% LDCE	IRISSET
RSSJE	Refresher Course For SSE/JE (Signal &	IRISSET
ITSE	Initial Course For App SSE (Telecom)	IRISSET
ITJE	Initial Course For App.JE (Telecom)	IRISSET
ITPJE	Initial Course For Promoted JE/Telecom	IRISSET
RTSJE	Refresher Course For SSE/JE (Telecom)	IRISSET

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

In the above table, the nomenclature of Course Code is defined as

- First letter indicates Initial/Refresher Course.
- Second letter indicates Signal/Telecom Course
- Third/Fourth letter indicates level of participants.
- Last letter indicates “Engineer”

For eg. “ISSE/01/012020”

- ISSE means that this is an Initial Signal SSE course
- 01 means that this the Phase-I of the ISSE course
- 012020 means that this is the first ISSE course of the year 2020

Course Code used for Maintainers (being dealt at Zonal Railway S&T Training Centre)

Course Code	Course Name	Place of Training
SNT2A	Initial Course For Apprentice Technician (Signal) Grade-I	STTC
SNT2B	Initial Course For Apprentice Technician (Signal) Grade-III	STTC
SNT9	Foundation Course For Promote Technician (Signal) Gr-III	STTC
SNT4	Refresher Course For Technician (Signal)	STTC
SNT6A	Refresher Course For Helpers – Signal	STTC
SNT1	Induction To Unskilled Helpers - Signal & Telecom	STTC
SNT3	Initial Course For Apprentice Technician (Telecom) Grade-III	STTC
SNT5	Refresher Course For Technician (Telecom)	STTC
SNT10	Foundation Course For Promotee Technician (Telecom)Gr-III	STTC
SNT6B	Refresher Course For Helpers-Telecom	STTC

These courses, including “Initial Course For Promoted JE/Signal-(Intermediate)” for trainees through 40 % quota, shall be organized at Zonal Railways S&T Training centre.

18. Mobile Phones/Tabs shall not be allowed in class Rooms & Labs by Trainees. Smoking/Drinking/Pan/Gutkha etc shall not be allowed in the premises. Strict discipline to be maintained in the campus. An undertaking to be taken from trainees at the beginning of course.

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

19. E-Learning shall be encouraged. Technical notes may be given on DVD to Trainees. Hard copy may be given to trainees from PSU/Pvt on demand.
20. At the end of the each course, a group Feedback may be taken for improvements (if any) for courses having duration more than 2 weeks. For other courses, it is optional at the discretion of Head of Institute.
21. Mark list to be communicated to controlling authority for each trainee to plan for their Utilization.

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

I.

SUMMARY SHEET											
(Initial Courses For JE/SSE)											
Sl. No.	Course Code	Institutional Training Duration (in weeks)			Duration in Zonal Railways (in weeks) (D)	Total Duration (in weeks) (E=C+D)	Marks				
		Ph-I (A)	Ph-II (B)	Total (C=A+B)			Institutional Training			Zonal Rlys. (I)	Total (J=H+I)
							Ph-I (F)	Ph-II (G)	Total (H=F+G)		
1	ISSE	13	12	25	27	52	1000	1000	2000	1000	3000
2	ISJE	14	14	28	24	52	1000	1000	2000	1000	3000
3	IDSJE	9	9	18	34	52	950	800	1750	1250	3000
4	ISPE	8	9	17	17	34	900	1000	1900	600	2500
5	ITSE	12	13	25	27	52	1000	1000	2000	1000	3000
6	ITJE	14	14	28	24	52	1000	1000	2000	1000	3000
7	ITPE	6	6	12	22	34	750	850	1600	600	2200

II.

SUMMARY SHEET											
(Initial Courses For Artisans And Erstwhile Group D)											
Sl. No.	Course Code	Institutional Training Duration (in weeks)			Duration in Zonal Railways (in weeks) (D)	Total Duration (in weeks) (E=C+D)	Marks				
		Ph-I (A)	Ph-II (B)	Total (C=A+B)			Institutional Training			Zonal Rlys. (I)	Total (J=H+I)
							Ph-I (F)	Ph-II (G)	Total (H=F+G)		
1	SNT2A GR-I	8	17	25	53	78	500	900	1400	600	2000
2	SNT2B GR-III	8	9	17	35	52	500	600	1100	400	1500
3	SNT3	8	9	17	35	52	500	500	1000	500	1500

SIGNALLING COURSES

COURSES FOR JE/SSE SIGNAL

1.0 INITIAL COURSE FOR APPRENTICE SSE (SIGNAL)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 13 WEEKS	2000
		PHASE II: 12 WEEKS	
		(Sub-Total): 25 weeks	
FIELD TRAINING	ZONAL RAILWAYS	27 WEEKS	1000
TOTAL		52 WEEKS	3000

1.1 OVERVIEW OF PHASE-I - ISSE/01

A. Course Program : 13 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	230
3	THEORY EXAMINATION	15
4	PRACTICALS	104
5	PRACTICAL EXAMINATION	16
6	MISCELLANEOUS (Project Allotment)	2
7	CD SPARE	20
Total		390 Hrs

B. Summary of Evaluation :

Sl. No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	16	400
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	G10	Personality Development & Communication Skills	9	-
2	G11	General: Etiquette, Conduct, Ethics, Gender Sensitization		
3	S-1	Basics of Signal Engineering	22	50
4	S-2	Principles of Interlocking	18	50
5	S-3	Mechanical Signalling - Single Wire & Rodding	6	-
6	S-5	Locking Table	16	30
7	S-6	Locking Chart	8	20
8	S-19	Signalling Relays and Cables	10	50
9	S-25	Train Detection - Track Circuits	16	50
10	S-21	Electric Point Machine & Signal Machine	12	25
11	S-10	Colour Light and Automatic Signalling	15	25
12	S-20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter	10	25
13	S-22	Block Working - SL Token and DL Block Instruments	16	25
14	S-11	Control and Selection Table	20	60
15	S-12	Relay Interlocking - Metal to Carbon Relays (British)	26	60
16	S-13	Circuit Practices - British	26	30
Total			230	500

D. Theory Examinations

Exam	Subjects	Hours	Marks
Exam-I	S1, S2	3	100
Exam-II	S5 S6	2	50
Exam-III	S19, S25,	3	100
Exam-IV	S10, S20, S21, S22	3	100
Exam-V	S11, S12, S13	4	150
Total		15	500

E. Practical

Sl.No.	Lab	Hours	Marks
1	Outdoor Signalling Lab	46	100
2	Electrical Signalling Lab.	32	100
3	Block Signalling Lab	12	100
4	Train Detection Lab	12	100
5	E- Learning	2	0
Total		104	400

F. Practical Examinations

Sl.No	Lab	Type	Hours	Marks
1	Outdoor Signalling Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100
2	Electrical Signalling Lab		4	100
3	Block Signalling Lab		4	100
4	Train Detection Lab		4	100
Total			16	400

G. Miscellaneous

Sl.No.	Description	Hours
1	Project Allotment	2

H. CD Spare

Sl.No.	Item	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	20

Note:- (1) In case where few SSE's are reporting for training, their course will be merged with that of JE/Signal.

1.2 OVERVIEW OF PHASE-II – ISSE/02

A. Course Program: 12 Weeks

Sl.No	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	204
3	THEORY EXAMINATION	15
4	PRACTICALS	94
5	PRACTICAL EXAMINATION	16
6	MISCELLANEOUS (Study Tour (Optional) & project presentation)	10
7	CD SPARE	18
Total		360 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	16	300
3	PROJECT WORK	4	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S14	Relay Interlocking - Metal to Metal Relays (Siemens)	15	20
2	S15	Panel Interlocking with Metal to Metal Relays (Siemens)	14	30
3	S16	RRI Siemens	10	30
4	S17	Circuit Practice-Siemens	13	20
5	S26	Train Detection Devices - Axle Counters - Analog & Digital	14	40
6	S23	Tokenless Block Instrument for Single Line	10	30
7	S24	Intermediate Block Signalling, Block Working - Axle Counters	10	30
8	S7	Signalling in 25KV AC Electrified Section	10	25
9	S18	Electronic Interlocking	14	50
10	S28	Data Loggers, TPWS & ETCS	10	30
11	S9	Power Supply for Signalling	12	25
12	S8	Signalling General	12	25
13	S29	Railway Signalling - Construction Practices	6	25
14	S27	Signalling Safety & Case Studies	6	20
15	TCS1	Principle of Telephony	4	15
16	TC1	Line Plant Practice & Telecom. Cables	4	15
17	TC6	Train Traffic Control	4	15
18	TCT4	Optical Fibre Cables & Systems	4	15
19	TA1	Mobile Train Radio Communication	2	15
20	C1	Information Technology & Hardware	2	-
21	G1	Vigilance	2	-
22	G3	Tenders and Contracts	2	-
23	G2	Rajabasha	2	-
24	G5	Establishment	8	25
25	G6	Stores and Accounts	2	-
26	G9	Disaster Management & Accident Communication	4	-
27	EL	Extension Lectures (P-Way, C&W, First Aid & Fire Fighting)	8	-
Total			204	500

D. Theory Examinations

Exam	Subjects	Hours	Marks
Exam-I	S23, S24,S26	3	100
Exam-II	S14, S15, S16, S17	3	100
Exam-III	S18, S27, S28	3	100
Exam-IV	S7, S8, S9, S29	3	100
Exam-V	TC1, TCS1, TC6, TA1, TCT4, G5	3	100
Total		15	500

E. Practical

Sl.No.	Name of Lab	Hours	Marks
1.	Outdoor Signalling Lab	14	75
2.	Electrical Signalling Lab	26	75
3.	Block Lab	24	75
4.	Train Detection Lab	16	75
5.	Optical Fiber Cable Lab	2	0
6.	Outdoor Telecom Lab	4	0
7.	Telephony Lab	2	0
8.	Control Lab	4	0
9.	Computer Lab (AUTO CAD)	2	0
Total		94	300

F. Practical Examinations

Sl.No.	Lab	Type	Hours	Marks
1.	Outdoor Signalling Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	75
2.	Electrical Signalling Lab		4	75
3.	Block Signalling Lab		4	75
4.	Train Detection Lab		4	75
Total			16	300

G. Miscellaneous

Sl.No	Details	Hours
1	Study Tour (Optional)	6
2	Project Presentation	4
Total		10

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	18

2.0 INITIAL COURSE FOR APP.JE (SIGNAL)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 14 WEEKS	2000
		PHASE II: 14 WEEKS	
		(Sub-Total): 28 weeks	
FIELD TRAINING	ZONAL RAILWAYS	24 WEEKS	1000
TOTAL		52 WEEKS	3000

2.1 OVERVIEW OF PHASE-I – ISJE/01

A. Course Program: 14 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	254
3	THEORY EXAMINATION	15
4	PRACTICALS	108
5	PRACTICAL EXAMINATION	16
6	MISCELLANEOUS (Project Allotment)	4
7	CD SPARE	20
Total		420 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	16	400
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

Theory

Sl.No.	Code	Subject	Hours	Marks
1	G10	Personality Development & Communication skill	9	-
2	G11	Etiquette, Conduct, Ethics, Gender Sensitization, Personal Safety		-
3	S-1	Basics of Signal Engineering	22	50
4	S-2	Principles of Interlocking	18	50
5	S-3	Mechanical Signalling - Single Wire & Rodding	6	-
6	S-5	Locking Table	18	30
7	S-6	Locking Chart	10	20
8	S-10	Colour Light and Automatic Signalling	16	25
9	S-11	Control and Selection Table	19	60
10	S-12	Relay Interlocking - Metal to Carbon Relays (British)	36	60
11	S-13	Circuit Practices - British	28	30
12	S-19	Signalling Relays and Cables	14	50
13	S-20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter	10	25
14	S-21	Electric Point Machine & Signal Machine	14	25
15	S-22	Block Working - SL Token and DL Block Instruments	16	25
16	S-25	Train Detection - Track Circuits	18	50
Total			254	500

C. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	S1, S2	3	100
Exam-II	S5 S6	2	50
Exam-III	S19, S25,	3	100
Exam-IV	S10, S20, S21, S22	3	100
Exam-V	S11, S12, S13	4	150
Total		15	500

D. Practicals

Sl.No.	Lab	Hours	Marks
1	Outdoor signalling lab	46	100
2	Electrical Signalling Lab.	32	100
3	Block Lab	14	100
4	Train detection Lab	14	100
5	E- Learning	2	0
Total		108	400

E. Practical Examination

Lab	Type	Hours	Marks
Outdoor signalling lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100
Electrical Signalling Lab.		4	100
Block Lab		4	100
Train detection Lab		4	100
Total		16	400

F. Miscellaneous

Sl.No.	Description	Hours
1	Project work assignment	4

G. CD Spare

Sl.No.	Description	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	20

2.2 Overview of Phase-II – ISJE/02

A. Course Program: 14 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	250
3	THEORY EXAMINATION	15
4	PRACTICALS	98
5	PRACTICAL EXAMINATION	16
6	MISCELLANEOUS (Study Tour (Optional) & Projects Presentation)	14
7	CD-SPARE	24
Total		420 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	16	300
3	PROJECT WORK	8	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S14	Relay Interlocking - Metal to Metal Relays (Siemens)	16	20
2	S15	Panel Interlocking with Metal to Metal Relays (Siemens)	20	30
3	S16	RRI Siemens	16	30
4	S17	Circuit Practice-Siemens	18	20
5	S26	Train Detection Devices - Axle Counters - Analog & Digital	14	40
6	S23	Tokenless Block Instrument for Single Line	16	30
7	S24	Intermediate Block Signalling, Block Working - Axle Counters	12	30
8	S7	Signalling in 25KV AC Electrified Section	14	25
9	S18	Electronic Interlocking	20	50
10	S28	Data Loggers, TPWS & ETCS	10	30
11	S9	Power Supply for Signalling	14	25
12	S8	Signalling General	17	25
13	S29	Railway Signalling - Construction Practices	6	25
14	S27	Signalling Safety & Case Studies	6	20
15	TCS1	Principle of Telephony	4	15
16	TC1	Line Plant Practice & Telecommunication Cables	4	15
17	TC6	Train Traffic Control	4	15
18	TCT4	Optical Fibre Cables & Systems	4	15
19	TA1	Mobile Train Radio Communication	2	15
20	C1	Information Technology & Hardware	2	-
21	G1	Vigilance	2	-
22	G2	Rajbhasha	2	-
23	G3	Tenders and Contracts	2	-
24	G5	Establishment	8	25
25	G6	Accounts	2	-
26	G9	Disaster Management & Accident	4	-
27	EL	Extension Lectures (P-Way, C&W, First Aid & Fire Fighting)	11	-
Total			250	500

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	S23, S24,S26	3	100
Exam-II	S14, S15, S16, S17	3	100
Exam-III	S18, S27, S28	3	100
Exam-IV	S7, S8, S9, S29	3	100
Exam-V	TC1, TCS1, TC6, TA1, TCT4, G5	3	100
Total		15	500

E. Practical

Sl.No.	Lab	Hours	Marks
1	Outdoor Signalling Lab	16	75
2	Electrical Signalling Lab	26	75
3	Block Lab	24	75
4	Train Detection Lab	16	75
5	E-Learning	2	-
6	Optical Fibre Cable Lab	2	-
7	Outdoor Telecom Lab	4	-
8	Telephony Lab	2	-
9	Control Lab	4	-
10	Computer Lab(AUTO CAD)	2	-
Total		98	300

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1.	Outdoor signalling lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4 hrs	75
2.	Electrical Signalling Lab.		4 hrs	75
3.	Block Lab		4 hrs	75
4.	Train detection Lab		4 hrs	75
Total			16 hrs	300

G. Miscellaneous

Sl.No	Details	Hours
1	Study Tour (Optional)	6
2	Project Presentation	8
Total		14

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	24

3.0 INITIAL COURSE FOR APP. JE/SSE (DESIGN)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 9 WEEKS	1750
		PHASE II: 9 WEEKS	
		(Sub-Total): 18 weeks	
FIELD TRAINING	ZONAL RAILWAYS	34 WEEKS	1250
TOTAL		52 WEEKS	3000

3.1 OVERVIEW OF PHASE-I – IDSJE/01

A. Course Program: 9 Weeks

Sl.No	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	170
3	THEORY EXAMINATION	20
4	PRACTICALS	55
	PRACTICAL EXAMINATION	8
5	MISCELLANEOUS (Project Allotment)	2
6	CD SPARE	12
Total		270 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	20	650
2	PRACTICAL	8	200
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			950

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	G11	Etiquette, Conduct, Ethics, Gender Sensitization, Personal Safety	2	-
2	S1	Basics of Signalling Engineering	16	50
3	S2	Principles of Interlocking	18	60
4	S3	Mechanical Signalling- Single Wire and Rodding	8	50
5	S-5	Locking Table	16	40
6	S-6	Locking Chart	10	50
7	S-19	Signalling Relays and Cables	6	50
8	S-25	Train Detection - Track Circuits	5	50
9	S-21	Electric Point Machine & Signal Machine	6	35
10	S-10	Colour Light and Automatic Signalling	8	35
11	S-20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter	4	30
12	S-22	Block Working - SL Token and DL Block Instruments	5	40
13	S-11	Control and Selection Table	18	60
14	S-12	Relay Interlocking - Metal to Carbon Relays (British)	24	50
15	S-13	Circuit Practices - British	24	50
Total			170	650

D. Theory Examination

Sl.No	Subjects	Hours	Marks
Exam-I	S1, S19	3	100
Exam-II	S3, S25	3	100
Exam-III	S2,S5	3	100
Exam-IV	S6	2	50
Exam-V	S10, S20,S21	3	100
Exam-VI	S11,S22	3	100
Exam-VII	S12,S13	3	100
Total		20	650

E. Practicals

Sl.No.	Name of Lab	Hours
1	Outdoor Signalling Lab	27
2	Electrical Signalling Lab	12
3	Block Signalling Lab	4
4	Train Detection Lab	10
5	E-Learning	2
Total		55

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Outdoor signalling lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	2	50
2	Electrical Signalling Lab.		2	50
3	Block Lab		2	50
4	Train Detection Lab		2	50
Total			8	200

G. Miscellaneous

Sl .No	Details	Hours
1.	Project Work Allotment	2

H. CD Spare

Sl .No	Details	Hours
1.	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	12

3.2 OVERVIEW OF PHASE-II – IDSJE/02

A. Course Program: 9 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	166
3	THEORY EXAMINATION	12
4	PRACTICALS	41
5	PRACTICAL EXAMINATION	8
6	MISCELLANEOUS (Study Tour (Optional) & Project Presentation)	14
7	CD SPARE	26
	Total	270 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	12	400
2	PRACTICAL	8	200
3	PROJECT WORK	8	100
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total		800

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S14	Relay Interlocking - Metal to Metal Relays (Siemens)	12	40
2	S15	Panel Interlocking with Metal to Metal Relays (Siemens)	16	60
3	S16	RRI Siemens	8	40
4	S17	Circuit Practice-Siemens	30	60
5	S26	Train Detection Devices - Axle Counters - Analog & Digital	8	25
6	S23	Tokenless Block Instrument for Single Line	8	25
7	S24	Intermediate Block Signalling, Block Working - Axle Counters	8	25
8	S7	Signalling in 25KV AC Electrified Section	6	25
9	S18	Electronic Interlocking	10	25
10	S28	Data Loggers, TPWS & ETCS	10	25
11	S9	Power Supply for Signalling	4	20
12	S8	Signalling General	8	30
13	S27	Signalling Safety & accident case study	2	0
14	TC1	Line Plant Practice & Telecommunication Cables	4	0
15	TC6	Train Traffic Control	4	0
16	G1	Vigilance	2	0
17	G3	Tenders and Contracts & (Estimate- for JE Design)	10	0
18	G2	Rajabhasha	2	0
19	G5	Establishment, Ethics, work Load & Post Creation	6	0
20	G6	Stores and Accounts	2	0
21	EL	Extension Lectures (First Aid, Fire Fighting & Gender Sensitisation)	6	0
Total			166	400

D. Theory Examinations

Sl.No.	Subjects	Hours	Marks
Exam-I	S7,S8,S9,S26	3	100
Exam-II	S18,S23,S24,S28	3	100
Exam-III	S14,S15	3	100
Exam-IV	S16,S17	3	100
Total		12	400

E. Practical

Sl.No.	Name of Lab	Hours
1	Outdoor Signalling Lab	5
2	Electrical Signalling Lab	10
3	Block Lab	4
4	Train Detection Lab	10
5	Control Lab	4
6	Computer Lab (AUTO CAD)	8
Total		41

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Outdoor signalling lab	Record Sheets (20%) Experiment (50%)	2	50
2	Electrical Signalling Lab.		2	50
3	Block Lab	Viva-voce (30%)	2	50
4	Train Detection Lab		2	50
Total			8	200

G. Miscellaneous

Sl.No	Details	Hours
1.	Study Tour (Optional)	6
2.	Project Work	8
Total		14

H. CD Spare

Sl.No	Details	Hours
1.	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	26

4.0 INITIAL COURSE FOR PROMOTED JE/SIGNAL (INTERMEDIATE)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 08 WEEKS	1900
		PHASE II: 09 WEEKS	
		(Sub-Total): 17 weeks	
FIELD TRAINING	ZONAL RAILWAYS	17 WEEKS	600
TOTAL		34 WEEKS	2500

4.1 OVERVIEW OF PHASE-I – ISPE/01

A. Course Program: 8 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	124
3.	THEORY EXAMINATION	15
4.	PRACTICALS	66
5.	PRACTICAL EXAMINATION	12
6.	MISCELLANEOUS (Project Allotment)	4
7.	CD SPARE	16
Total		240 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	12	300
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			900

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S1	Basics of Signal Engineering	12	50
2	S2	Principle of Interlocking	9	50
3	S3	Mechanical Signalling - Single Wire and Rodding	6	20
4	S5	Locking Table	8	30
5	S6	Dog Chart	6	20
6	S10	Colour Light and Automatic Signalling	8	25
7	S11	Control and Selection Table	16	60
8	S12	Relay Interlocking - Metal to Carbon Relays (British)	16	60
9	S13	Circuit Practices - British	10	30
10	S19	Signalling Relays and Cables	6	50
11	S20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter	4	25
12	S21	Electric Point Machine & Signal Machine	7	25
13	S22	Block Working - SL Token and DL Block Instruments	8	25
14	S25	Train Detection - Track Circuits	8	50
Total			124	500

D. Theory Examinations

Exam	Subjects	Hrs	Marks
Exam-I	S1,S2	3	100
Exam-II	S19,S25	3	100
Exam-III	S11,S12,S13	4	150
Exam-IV	S10,S20,S21,S22	3	100
Exam-V	S3,S5	2	50
Total		15	500

E. Practical

Sl.No.	Lab	Hours
1	Outdoor Signalling Lab	32
2	Electrical Signalling Lab	16
3	Block Signalling Lab	10
	Train Detection Lab	6
4	E-Learning	2
Total		66

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Outdoor Signalling Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	3	75
2	Electrical Signalling Lab		3	75
3	Block Signalling Lab		3	75
4	Train Detection Lab		3	75
Total			12	300

G. Miscellaneous

Sl.No	Item	Hours
1	Project Allotment	4

H. CD Spare

Sl.No	Details	Hours
1.	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	16

4.2 Overview of Phase-II – ISPE/02

A. Course Program : 9 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	170
3.	THEORY EXAMINATION	15
4.	PRACTICALS	50
5.	PRACTICAL EXAMINATION	12
6.	MISCELLANEOUS (Project Presentation)	6
7.	CD SPARE	14
Total		270 Hrs

B. Summary of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	12	300
3	PROJECT WORK	6	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S7	Signalling in 25KV AC Electrified Section	6	25
2	S8	Signalling General	8	25
3	S9	Power Supply for Signalling	6	25
4	S14	Relay Interlocking - Metal to Metal Relays (Siemens)	8	20
5	S15	Panel Interlocking with Metal to Metal Relays (Siemens)	19	50
6	S16	RRI Siemens	10	30
7	S18	Electronic Interlocking	14	40
8	S23	Tokenless Block Instrument for Single Line	14	40
9	S24	Intermediate Block Signalling, Block Working - Axle Counters	9	30
10	S26	Train Detection Devices - Axle Counters - Analog & Digital	10	30
11	S27	Signalling Safety & Case Studies	4	30
12	S28	Data Loggers, TPWS & ETCS	16	30
13	S29	Railway Signalling - Construction Practices	6	25
14	TC6	Train Traffic Control	4	20
15	TCT4	Optical Fibre Cables & Systems	4	20
16	C2	MS Office	6	0
17	G1	Vigilance	2	0
18	G3	Tenders and Contracts	4	10
19	G2	Rajbhasha	2	0
20	G5	Establishment, Work Load & Post Creation	6	40
21	G6	Stores & Accounts	2	10
22	G9	Disaster Management and Accident Communication	4	0
23	EL	Extension Lecture (P-Way, C&W Fire Fighting, First Aid/Stress Mgmt. & Gender sensitization)	6	0
Total			170	500

D. Theory Examinations

Exam	Subjects	Hours	Marks
Exam-I	S7,S8,S9,S29	3	100
Exam-II	S23,S24,26	3	100
Exam-III	S14,S15,S16	3	100
Exam-IV	S18,S27,S28	3	100
Exam-V	TC6,TCT4,G5,G3,G6	3	100
Total		15	500

E. Practical

Sl.No	Lab	Hours	Marks
1	Outdoor Signalling Lab	6	75
2	Electrical Signalling Lab	14	75
3	Block Signalling Lab	12	75
4	Train Detection Lab	12	75
5	Digital Lab	2	0
6	Control Lab	4	0
Total		50	300

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Outdoor Signalling Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	3	75
2	Electrical Signalling Lab		3	75
3	Block Signalling Lab		3	75
4	Train Detection Lab		3	75
Total			12	300

G. Miscellaneous

Sl.No	Item	Hours
1	Projects Evaluation	6

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	14

5.0 REFRESHER COURSE FOR SSE/JE (SIGNAL & DESIGN)

Name of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	04 Weeks	200

A. Course Program - RSSJE

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	76
3.	THEORY EXAMINATION	3
4.	PRACTICALS	32
5	CD SPARE	6
Total		120

B. Summary of Evaluation:

Sl. No.	Topic	Hours	Marks
1	THEORY	03	100
2	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
3	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			200

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	S7	Signalling in 25KV AC Electrified Section	4	4
2	S8	Signalling General	4	6
3	S9	Power Supply for Signalling	4	6
4	S10	Colour Light and Automatic Signalling	2	7
5	S12	Relay Interlocking - Metal to Carbon Relays (British)	9	18
6	S14	Relay Interlocking - Metal to Metal Relays (Siemens)	8	18
7	S18	Electronic Interlocking	6	9
8	S20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter	2	0
9	S21	Electric Point Machine & Signal Machine	2	7
10	S24	Intermediate Block Signalling, Block Working - Axle Counters	4	8
11	S25	Train Detection - Track Circuits	4	6
12	S26	Train Detection Devices - Axle Counters - Analog & Digital	4	6
13	S27	Signalling Safety & Case Studies	2	0
14	S28	Data Loggers, TPWS & ETCS	4	5
15	G1	Vigilance	2	0
16	G2	Rajbasha	2	0
17	G3	Tenders & Contract	2	0
18	G5	Establishment	3	0
19	G6	Stores & Accounts	4	0
20	G9	Disaster Management & Accident communication	2	0
21	EL	Extension Lecture (P-Way)	2	0
Total			76	100

D. Theory Examination

Sl.No	Exam	Marks	Hours
1	Exam	100	3 hrs

E. Practical

Sl.No.	Lab	Hours
1	Electrical Signalling Lab.	8
2	Block Signalling Lab	8
3	Outdoor Signalling Lab	6
4	Train Detection Lab	10
Total		32

F. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	6

**COURSES FOR TECHNICIAN (SIGNAL)
& ERSTWHILE GR-D**

**6.0 INITIAL COURSE FOR APPRENTICE TECHNICIAN (SIGNAL)
Grade-I**

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	PHASE I : 8 WEEKS	500
		PHASE II: 17 WEEKS	900
		(Sub-Total): 25 weeks	1400
FILED TRAINING	ZONAL RAILWAYS	53 WEEKS	600
TOTAL		78 WEEKS	2000

6.1 OVERVIEW OF PHASE-I – SNT2A

A. Course Program: 8 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	126
3	THEORY EXAMINATION	9
4.	PRACTICALS	128
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	12
Total		288 Hrs

B. Summary Of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	09	300
2	PRACTICAL	04	100
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total		--	500

C. Theory

Code	Subject	Hours	Marks
ST-01	General	6	20
ST-02	Cleanliness, Personal Safety, Fire Prevention, First Aid	6	10
ST-03(a)	Use of Hand Measuring Instruments, and Portable tools.	8	20
ST-04	Power equipment, Cells and Battery, IPS, DG Set, Solar panel	20	50
ST-05	Basic Electricity and Magnetism	12	20
ST-15	Basic Concept of Signaling	20	40
ST-19	Relays & Cables	16	40
ST-20	Track Circuit	12	30
ST-21	Color Light Signals, LED Signals	6	20
ST-22	Point Machine	12	30
ST-30	Electro Mechanical Signaling (EOLB&MOLB)	8	20
	Total	126	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	ST-01,02,03 &04	03	100
Exam-II	ST-05,15 &19	03	100
Exam-III	ST-20,21 ,22 &30	03	100
	Total	09	300

E. Practicals

Sl.No.	Practicals	Hours
1	Use of Hand Measuring Instruments, and Portable tools.	10
2	Power equipment, Cells and Battery, IPS, DG Set, Solar panel	24
3	Basic Electricity and Magnetism	6
4	Basic Concept of Signalling	6
5	Relays & Cables	18
6	Track Circuit	12
7	Color Light Signals, LED Signals	10
8	Point Machine	24
9	Electro Mechanical Signaling (EOLB&MOLB)	18
	Total	128

E. Practical Examination

Sl.No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

F. Miscellaneous

Sl.No	Item	Hours
1	Study Tour (Optional)	6

6.2: Overview of Phase-II

A. Course Program: 17 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	272
3	THEORY EXAMINATION	18
4.	PRACTICALS	272
5.	PRACTICALS EXAMINATION	8
6.	MISCELLANEOUS (Study Tour -Optional)	18
7.	CD SPARE	21
	Total	612 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	18	600
2	PRACTICAL	08	200
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total	--	900

C. Theory:

Code	Subject	Hours	Marks
ST-06	Safety in Train operation, Schedule of dimensions, Disaster Management.	10	30
ST-07	Computer Appreciation	8	10
ST-10	Telephone Instruments	4	10
ST-16	Orthodox Signalling	6	10
ST-17	Reverser, Lever Lock and Circuit Controllers, Arms and Light Repeater, Signal Machine	6	10
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	10	30
ST-23 (a)	Panel Interlocking (British)	24	40
ST-27	Automatic Signaling & IBS	20	40
ST-28	Signal Interlocking	10	20
ST-24	Axle Counter & BPAC	30	70
ST-32	TPWS, TCAS & AWS	8	30
ST-25 (a),(b)&(c)	Single Line Token , Token less and Double Line Block Instrument	48	100
ST-25(d)	UFSBI & SSBPAC	24	60
ST-26	Signaling RE Area	12	40
ST-23 (b)	Panel Interlocking. (Siemens)	12	20
ST-29	Route Relay interlocking	8	20
ST-31	EI & Data Logger	32	60
	Total	272	600

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-IV	ST-06,07,10,16 ,17 &18	03	100
Exam-V	ST-23(a),27 & 28	03	100
Exam-VI	ST-24 & 32	03	100
Exam-VII	ST-25(a),(b) & (c)	03	100
Exam-VIII	ST-25(d) & 26	03	100
Exam-IX	ST-23(b),29 & 31	03	100
	Total	18	600

E. Practicals

Code	Subject	Hours
ST-07	Computer Appreciation	14
ST-10	Telephone Instruments	4
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	10
ST-23 (a)	Panel Interlocking (British)	24
ST-27	Automatic Signaling & IBS	20
ST-28	Signal Interlocking	4
ST-24	Axle Counter & BPAC	36
ST-32	TPWS, TCAS & AWS	8
ST-25(a)	Single Line Token , Token less and Double Line Block Instrument	52
ST-25(b)	UFSBI & SSBPAC	32
ST-26	Signaling RE Area	12
ST-23 (b)	Panel Interlocking. (Siemens)	12
ST-29	Route Relay interlocking	12
ST-31	EI & Data Logger	32
	Total	272

F: Practical Examination

Sl No	Labs	Type	Hours	Marks
1	Practical	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	8	200

G. Miscellaneous

Sl No	Item	Hours
1	Study Tour (Optional)	18

7.0 INITIAL COURSE FOR APPRENTICE TECHNICIAN (SIGNAL) GR-III

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	PHASE I : 08 WEEKS	500
		PHASE II :09 WEEKS	600
		(Sub-Total) : 17 WEEKS	1100
FILED TRAINING	ZONAL RAILWAYS	35 WEEKS	400
TOTAL		52 WEEKS	1500

7.1 OVER VIEW OF PHASE-I – SNT2B

A. Course Program: 8 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	126
3	THEORY EXAMINATION	9
4.	PRACTICALS	128
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	12
Total		288 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	06	300
2	PRACTICAL	04	100
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total		--	500

C. Theory:

Code	Subject	Hours	Marks
ST-01	General	6	20
ST-02	Cleanliness, Personal Safety, Fire Prevention, First Aid	6	10
ST-03(a)	Use of Hand Measuring Instruments, and Portable tools.	8	20
ST-04	Power equipment, Cells and Battery, IPS, DG Set, Solar panel	20	50
ST-05	Basic Electricity and Magnetism	12	20
ST-15	Basic Concept of Signalling	20	40
ST-19	Relays & Cables	16	40
ST-20	Track Circuit	12	30
ST-21	Color Light Signals, LED Signals	6	20
ST-22	Point Machine	12	30
ST-30	Electro Mechanical Signaling (EOLB&MOLB)	8	20
	Total	126	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	ST-01,02,03,04	03	100
Exam-II	ST-05,15,19	03	100
Exam-III	ST-20,21,22 & 30	03	100
	Total	09	300

E. Practicals

Sl. No.	Practicals	Hours
1	Use of Hand Measuring Instruments, and Portable tools.	10
2	Power equipment, Cells and Battery, IPS, DG Set, Solar panel	24
3	Basic Electricity and Magnetism	6
4	Basic Concept of Signalling	6
5	Relays & Cables	18
6	Track Circuit	12
7	Color Light Signals, LED Signals	10
8	Point Machine	24
9	Electro Mechanical Signaling (EOLB&MOLB)	18
	Total	128

F: Practical Examination

Sl.No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl.No	Item	Hours
1	Study Tour (Optional)	6

7.2 : Overview of Phase-II

A. Course Program : 9 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	142
3	THEORY EXAMINATION	12
4.	PRACTICALS	142
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	15
	Total	324 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	12	400
2	PRACTICAL	04	100
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total	--	600

C. Theory:

Code	Subject	Hours	Marks
ST-06	Safety in Train operation, Schedule of dimensions, Disaster Management.	6	20
ST-07	Computer Appreciation	4	10
ST-10	Telephone Instruments	2	10
ST-16	Orthodox Signalling	4	10
ST-17	Reverser, Lever Lock & Circuit Controllers, Arms & Light Repeater, Signal Machine	4	10
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	6	10
ST-27	Automatic Signaling & IBS	10	30
ST-28	Signal Interlocking	8	20
ST-23 (a)	Panel Interlocking (British)	12	30
ST-24	Axle Counter & BPAC	18	50
ST-25	Single Line Token , Token less and Double Line Block Instrument, UFSBI & SSBPAC	36	100
ST-26	Signaling RE Area	6	20
ST-23 (b)	Panel Interlocking. (Siemens)	6	10
ST-29	Route Relay interlocking	4	20
ST-31	EI & Data Logger	12	40
ST-32	TPWS, TCAS & AWS	4	10
	Total	142	400

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-III	ST-06,07,10,16,17,18&27	03	100
Exam-IV	ST-28,23(a)&24	03	100
Exam-V	ST-25	03	100
Exam-VI	ST-26, 23(b),29,31&32	03	100
	Total	12	400

E. Practicals

Code	Subject	Hours
ST-07	Computer Appreciation	4
ST-10	Telephone Instruments	2
ST-16	Orthodox Signalling	4
ST-17	Reverser, Lever Lock & Circuit Controllers, Arms & Light Repeater, Signal Machine	4
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	6
ST-27	Automatic Signaling & IBS	12
ST-28	Signal Interlocking	2
ST-23 (a)	Panel Interlocking (British)	20
ST-24	Axle Counter & BPAC	20
ST-25	Single Line Token , Token less and Double Line Block Instrument, UFSBI & SSBPAC	36
ST-26	Signaling RE Area	6
ST-23 (b)	Panel Interlocking. (Siemens)	6
ST-29	Route Relay interlocking	4
ST-31	EI & Data Logger	12
ST-32	TPWS, TCAS & AWS	4
	Total	142

F: Practical Examination

Sl No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl No	Item	Hours
1	Study Tour (Optional)	6

**8.0 FOUNDATION COURSE FOR PROMOTEE
TECHNICIAN SIGNAL -GR-III**

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	8 weeks	500

A. Course Program – SNT9

Sl.No.	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	126
3	THEORY EXAMINATION	9
4.	PRACTICALS	126
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	14
	Total	288 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	09	300
2	PRACTICAL	04	100
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total	--	500

C. Theory

Code	Subject	Hours	Marks
ST-03 (a)	Use Of Hand Measuring Instruments & Portable Tools	4	10
ST-04	Power Equipments, Cell & Battery, IPS, DG Set & Solar Panel	12	20
ST-05	Basic Electricity & Magnetism	4	10
ST-06	Safety in Train Operation, Schedule of dimensions, Disaster Management	6	10
ST-15	Basic Concept Of Signaling	12	30
ST-16	Orthodox Signalling	3	10
ST-17	Reverser, Lever Lock & Circuit Controllers, Arms & Light Repeater, Signal Machine	3	10
ST-18	Inter slotting, Electrical Key Transmitter & Electrical Detector	6	10
ST-19	Signaling Relays & Cables	12	20
ST-20	Track Circuit	8	20
ST-21	CLS, LED Signals	4	10
ST-22	Point Machine	8	20
ST-23 (a)	Panel Interlocking (British)	6	20
ST-24	Axle Counter & BPAC	6	10
ST-25	Introduction to Single Line Token, Token Less, DLBI, UFSBI & SSBPAC	12	30
ST-26	Signaling RE Area	2	6
ST-27	Automatic Signaling & IBS	6	10
ST-29	Route Relay Interlocking	6	10
ST-30	Electro Mechanical Signaling (EOLB&MOLB)	4	20
ST-31	EI & Data Logger	6	10
ST-32	TPWS, TCAS & AWS	2	4
	Total	126	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	ST-03,04,05,06,15,16&17	03	100
Exam-II	ST-18,19,20,21&23(a)	03	100
Exam-III	ST-24,25,26,27, 29,30, 31& 32	03	100
	Total	09	300

E. Practicals

Code	Subject	Hours
ST-03 (b)	Use Of Hand Measuring Instruments & Portable Tools	4
ST-04	Power Equipments, Cell & Battery, IPS, DG Set & Solar Panel	12
ST-05	Basic Electricity & Magnetism	4
ST-06	Safety in Train Operation, Schedule of dimensions, Disaster Management	4
ST-15	Basic Concept Of Signaling	8
ST-16	Orthodox Signalling	3
ST-17	Reverser, Lever Lock & Circuit Controllers, Arms & Light Repeater, Signal Machine	3
ST-18	Inter slotting, Electrical Key Transmitter & Electrical Detector	6
ST-19	Signaling Relays & Cables	12
ST-20	Track Circuit	8
ST-21	CLS, LED Signals	4
ST-22	Point Machine	8
ST-23 (a)	Panel Interlocking (British)	6
ST-24	Axle Counter & BPAC	6
ST-25	Introduction to Single Line Token, Token Less, DLBI, UFSBI & SSBPAC	12
ST-26	Signaling RE Area	2
ST-27	Automatic Signaling & IBS	6
ST-29	Route Relay Interlocking	6
ST-30	Electro Mechanical Signaling (EOLB&MOLB)	4
ST-31	EI & Data Logger	6
ST-32	TPWS, TCAS & AWS	2
	Total	126

F. Practical Examination

Sl No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl No	Item	Hours
1	Study Tour (Optional)	6

9.0 REFRESHER COURSE FOR TECHNICIAN (SIGNAL)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	4 weeks	200

A. Course Program – SNT4

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	80
3	THEORY EXAMINATION	3
4.	PRACTICALS	40
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	8
	Total	144

B. Summary Of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	03	100
2	PRACTICAL	04	80
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	10
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	10
	Total	--	200

C. Theory

Code	Subject	Hours	Marks
ST-04	Power equipment, Cells and Battery, IPS, DG Set, Solar Panel	3	4
ST-06	Safety in Train operation, Schedule of dimensions, Disaster Management.	4	6
ST-15	Basic Concept of Signalling	4	4
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	2	4
ST-19	Relays & Cables	4	6
ST-20	Track Circuit	4	6
ST-21	Color Light Signals, LED Signals	2	4
ST-22	Point Machines	4	6
ST-23	Panel Interlocking-British	6	6
ST-24	Axle Counter and BPAC	6	6
ST-25	Single Line Token, Token less and Double Line Block Instrument, UFSBI & SSBPAC	14	20
ST-26	Signalling in RE area	4	4
ST-27	Automatic Signalling & IBS	6	6
ST-29	Route Relay Interlocking	2	2
ST-30	Electromechanical Signaling	4	6
ST-31	Electronic Interlocking & data Logger	8	8
ST-8/50/55	Telecom cables (Quad Cable), OFC, Data Networks	3	2
	Total	80	100

D. Theory Examination

Exam	Subject	Hours	Marks	
			Subjective	Objective
Exam-I	ALL	3	30	70

E. Practicals

Code	Subject	Hours
ST-04	Power equipment, Cells and Battery, IPS, DG Set, Solar Panel	2
ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	2
ST-19	Relays & Cables	2
ST-20	Track Circuit	2
ST-21	Color Light Signals, LED Signals	2
ST-22	Point Machines	4
ST-23	Panel Interlocking- British	4
ST-24	Axle Counter and BPAC	4
ST-25	Single Line Token, Token less and Double Line Block Instrument, UFSBI & SSBPAC	6
ST-27	Automatic Signaling & IBS	2
ST-29	Route Relay Interlocking	2
ST-30	Electromechanical Signaling	2
ST-31	Electronic Interlocking & data Logger	4
ST-8/50/55	Telecom cables (Quad Cable), OFC, Data Networks	2
	Total	40

F. Practical Examination

Sl.No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	80

G. Miscellaneous

Sl.No	Item	Hours
1	Study Tour (Optional)	6

10.0 REFRESHER COURSE FOR HELPERS (SIGNAL)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	2 weeks	200

A. Course Program-SNT6A

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	28
3	THEORY EXAMINATION	3
4.	PRACTICALS	28
5.	PRACTICALS EXAMINATION	4
6.	CD SPARE	6
	Total	72

B. Summary of Evaluation :

Sl No	Topic	Hours	Marks
1	THEORY	03	100
2	PRACTICAL	04	80
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	10
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	10
	Total	--	200

C. Theory

Code	Subject	Hours	Marks
ST-01	General	2	10
ST-02	Cleanliness, Personal Safety, Fire Prevention & First Aid	1	4
ST-03(c)	Measuring Instruments & Portable Tools	2	6
ST-04	Power Equipments, Cell & Battery, IPS, DG Set , Solar Panel	3	10
ST-06	Safety in Operation , Schedule of Dimensions & Disaster Management	2	6
ST-19	Signaling Relays , Cables & ELD	1	4
ST-20	Track Circuit	2	8
ST-21	CLS, LED Signals	2	6
ST-22	Point Machine	2	8
ST-24	Axle Counter & BPAC	2	8
ST-25	Introduction to Block Instruments.. S/L Token, Token Less , DLBI, UFSBI & SSBAPC	2	10
ST-26	Signaling in RE Area	1	2
ST-29	Introduction Relay Interlocking	2	4
ST-30	Electro Mechanical Signaling (MOLB & EOLB)	2	6
ST-31	Electronic Interlocking & Data Logger	2	8
	Total	28	100

D. Theory Examination

Exam	Subjects	Hours	Marks (Objective)
Exam-I	ALL	3	100

E. Practicals

Code	Subject	Hours
ST-01	General	2
ST-02	Cleanliness, Personal Safety, Fire Prevention & First Aid	1
ST-03 (c)	Measuring Instruments & Portable Tools	2
ST-04	Power Equipments, Cell & Battery, IPS, DG Set , Solar Panel	3
ST-06	Safety in Operation , Schedule of Dimensions & Disaster Management	2
ST-19	Signaling Relays , Cables & ELD	1
ST-20	Track Circuit	2
ST-21	CLS, LED Signals	2
ST-22	Point Machine	2
ST-24	Axle Counter & BPAC	2
ST-25	Introduction to Block Instruments.. S/L Token, Token Less , DLBI, UFSBI & SSBAPC	2
ST-26	Signaling in RE Area	1
ST-29	Introduction Relay Interlocking	2
ST-30	Electro Mechanical Signaling (MOLB & EOLB)	2
ST-31	Electronic Interlocking & Data Logger	2
	Total	28

F. Practical Examination

Sl.No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	80

G. Miscellaneous

Sl.No	Item	Hours
1	Study Tour (Optional)	6

**11.0 INDUCTION COURSE FOR UNSKILLED HELPERS
(SIGNAL & TELE)**

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	4 weeks	200

A. Course Program – SNT1

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	60
3	THEORY EXAMINATION	3
4.	PRACTICALS	60
5.	PRACTICALS EXAMINATION	4
6	MISCELLANEOUS (Study Tour -Optional)	6
7.	CD SPARE	8
	Total	144

B. Summary of Evaluation :

Sl. No	Topic	Hours	Marks
1	THEORY	03	100
2	PRACTICAL	04	80
3	TRAINEE'S CONDUCT IN HOSTELS & CLASS ROOMS	--	10
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	10
	Total	--	200

C. Theory

Code	Subject	Hours	Marks
ST-01	General	4	6
ST-02	Cleanliness, Personal Safety, Fire Prevention & First Aid	4	4
ST-03 (c)	Use Of Hand Measuring Instruments & Portable Tools	6	10
ST-04	Power Equipments, Cell & Battery, IPS, DG Set & Solar Panel	6	12
ST-05	Basic Electricity & Magnetism	6	10
ST-15	Basic Concept Of Signaling	6	12
ST-19	Signaling Relays & Cables	4	6
ST-20	Track Circuit	4	6
ST-21	CLS, LED Signals	2	4
ST-22	Point Machine	6	8
ST-30	Electro Mechanical Signaling	2	4
ST-07	Computer Appreciation	2	6
ST-08	Cables & OFC	2	4
ST-49	Train Traffic Control	3	4
ST-53	Emergency Communication	3	4
	Total	60	100

D. Theory Examination

Sl.No	Exam	Subjects code	Hours	Marks (Objective)
1	Exam-I	ALL	3	100

E. Practicals

Code	Subject	Hours
ST-03(b)	Use Of Hand Measuring Instruments & Portable Tools	8
ST-04	Power Equipments, Cell & Battery, IPS, Dg Set & Solar Panel	10
ST-05	Basic Electricity & Magnetism	6
ST-15	Basic Concept Of Signaling	4

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

Code	Subject	Hours
ST-19	Signaling Relays & Cables	4
ST-20	Track Circuit	6
ST-21	CLS, LED Signals	2
ST-22	Point Machine	6
ST-30	Electro Mechanical Signaling	2
ST-07	Computer Appreciation	2
ST-08	Cables & OFC	4
ST-49	Train Traffic Control	3
ST-53	Emergency Communication	3
	Total	60

F. Practical Examination

Sl.No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	80

G. Miscellaneous

Sl.No	Item	Hours
1	Study Tour (Optional)	6

TELECOM COURSES

COURSES FOR JE/SSE
TELECOM

12.0 INITIAL COURSE FOR APP. SSE (TELECOM)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 12 WEEKS	2000
		PHASE II: 13 WEEKS	
		(Sub-Total): 25 weeks	
FIELD TRAINING	ZONAL RAILWAYS	27 WEEKS	1000
TOTAL		52 WEEKS	3000

12.1 OVERVIEW OF PHASE-I - ITSE/01

A. Course Program: 12 Weeks

Sl. No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	160
3	THEORY EXAMINATION	15
4	PRACTICALS	140
5	PRACTICAL EXAMINATION	20
6	MISCELLANEOUS	2
7	CD SPARE	20
Total		360 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	20	400
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	G10	Personality Development & Communication Skills	09	-
2	G11	Etiquette, Conduct, Ethics, Gender Sensitization etc		-
3	TB1	Telecom General Part-I	3	0
4	TB5	Radio Propagation	4	25
5	TB6	Measuring Instruments	10	25
6	TC1	Telecom Cables (Copper)	10	50
7	TCS1	Telephone Instruments	4	20
8	TCS4	ISDN Exchange and Advancements	12	40
9	TCS5	Signalling in Telecommunications	6	20
10	TCS6	IP Telephony and NGN	6	20
11	TCT2	PDH Principles	8	20
12	TCT3	PDH Equipments	10	20
13	TC6	Train Traffic Control	16	60
14	TCT1	Digital Radio Equipment	4	20
15	TA2	Data Communication & Networking	20	80
16	S1	Basic Concepts of Signalling	14	50
17	S8	Trolley Working	2	10
18	S22	Block Signalling / BPAC/ Datalogger	12	40
19	E.L.	Management Subjects	10	0
Total			160	500

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	TB5,TB6,TC1	3	100
Exam-II	TCS1,TCS4,TCS5,TCS6	3	100
Exam-III	TCT2,TCT3,TC6	3	100
Exam-IV	TA2,TCT1	3	100
Exam-V	S1,S8,S22	3	100
Total		15	500

E. Practical

Sl.No	Lab	Hours	Marks
1	Signalling Labs (ESL,BSL,ODSL & TDL)	12	0
2	Train Traffic Control Lab	16	50
3	Out Door Telecom Lab (Cables)	16	50

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

Sl.No	Lab	Hours	Marks
4	Telephony Lab	32	100
5	Transmission Systems Lab	34	100
6	Networking Lab	28	100
7	Computer Lab	02	0
	Total	140	400

F: Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Train Traffic Control Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	50
2	Out Door Telecom Lab (Cables)		4	50
3	Telephony Lab		4	100
4	Transmission Systems Lab		4	100
5	Networking Lab		4	100
	Total		20	400

G. Miscellaneous

Sl.No.	Description	Hours
1	Project Allotment	2

H. CD Spare

Sl.No.	Item	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	20

Note:- In case where few SSE's are reporting for training, their course will be merged with that of JE/Tele.

12.2 OVERVIEW OF PHASE-II – ITSE/02

A. Course Program : 13 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	230
3.	THEORY EXAMINATION	15
4.	PRACTICALS	88
5.	PRACTICAL EXAMINATION	12
6.	MISCELLANEOUS	18
7.	CD SPARE	24
	Total	390

B . Summary Of Evaluation:

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	12	300
3	PROJECT WORK	12	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total		1000

C. Theory

Sl.No.	Subject Code	Subject	Hours	Marks
1	TB1	Telecom General Part-II	10	20
2	TC2	PA System	6	20
3	TC3A	Passenger Information System	10	30
4	TC3B	ISS, Wi-Fi in station, CCTV in coaches, Nirbhaya Fund	8	
5	TC4	Power Supply Arrangements	10	30
6	TCT5	SDH Principles	14	50
7	TCT6	SDH Equipment	14	50
8	TA1	Mobile Communications	22	60
9	TA3	Data Networks of IR	10	40
10	TCT4	OFC Systems	16	60
11	TC5	Earthing & Surge Protection for Telecom Installations	8	40
12	G1	Vigilance	2	0
13	G2	Official Languages	2	0
14	G3	Tenders & Contracts	14	30
15	G5	Establishment matters	14	40
16	G6	Accounts & Stores	14	30
17	G7 (a)	Introduction to quality standards such as CENELEC, ISO (an awareness)	2	0
18	G7 (b) & G8	Introduction to RAM-Reliability Models, MTBF, MTBR Calculations and concept, Data acquisition, collection & statistical analysis	2	0
19	G9	Disaster management communication	4	0
20	G10 & E.L.	Mgmt Subjects- Time & Mind management, Group Coordination, Motivation, Organizational behavior, Health Issues (Heart & Diabetes)	12	0
21		SACFA Clearances/ RCIL/IRPMU/CRIS etc	9	0
22	NEW	Latest developments in Telecom like, Android Application, Data ware housing, CUG Etc	23	0
23	EL	Extension Lectures (First Aid & Fire Fighting)	4	0
		Total	230	500

D. Theory Examination

Sl No	Exam	Subjects	Hours	Marks
1	Exam-I	TB1,TC4,TC2,TC3	3	100
2	Exam-II	TCT5,TC6	3	100
3	Exam-III	TA1,TC5,	3	100
4	Exam-IV	TA3,TCT4	3	100
5	Exam-V	G3,G5,G6	3	100
Total			15	500

E. Practical :

Sl.No	Name of Lab	Hours	Marks
1	Passenger Information System Lab	12	100
2	Out Door Telecom Lab (Power Supply)	8	100
3	Transmission Systems Lab	60	100
4	Networking Lab	8	---
Total		88	300

F: Practical Examination

Sl. No	Labs	Type	Hours	Marks
1.	Passenger Information System Lab	Record Sheets (20%)	4	100
2.	Out Door Telecom Lab	Experiment (50%)	4	100
3.	Transmission Systems Lab	Viva-voce (30%)	4	100
Total			12	300

G. Miscellaneous

Sl .No	Details	Hours
1	Study Tour (Optional)	6
2	Project Presentation	12
Total		18

H. CD Spare

Sl .No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	24

13.0 INITIAL COURSE FOR APP.JE (TELECOM)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 14 WEEKS	2000
		PHASE II: 14 WEEKS	
		(Sub-Total): 28 weeks	
FIELD TRAINING	ZONAL RAILWAYS	24 WEEKS	1000
TOTAL		52 WEEKS	3000

13.1 OVERVIEW OF PHASE-I – ITJE/01

A. Course Program: 14 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	200
3	THEORY EXAMINATION	15
4	PRACTICALS	154
5	PRACTICAL EXAMINATION	20
6	MISCELLANEOUS (Project Allotment)	4
7	CD SPARE	24
Total		420 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	20	400
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	G11	Etiquette, Conduct, Ethics, Gender Sensitization, Personal Safety	4	-
2	TB1	Telecom General Part-I	6	0
3	TB4	Modulation Techniques (Digital)	4	0
4	TB3	Digital Electronics	4	0
5	TB5	Radio Propagation	6	25
6	TB6	Measuring Instruments	10	25
7	TC1	Telecom Cables (Copper)	12	50
8	TCS1	Telephone Instruments	6	20
9	TCS4	ISDN Exchange and Advancements	16	40
10	TCS5	Signaling in Telecommunications	6	20
11	TCS6	IP Telephony and NGN	10	20
12	TCT2	PDH Principles	12	20
13	TCT3	PDH Equipments	10	20
14	TC6	Train Traffic Control	18	60
15	TCT1	Digital Radio Equipment	6	20
16	TA2	Data communication & Networking	26	80
17	S1	Basic concepts of Signalling	14	50
18	S8	Trolley working	2	10
19	S22	Block signalling /BPAC/Dataloggers	10	40
20	G2	Official Language	2	0
21	G7(a)	Quality standards such as CENELEC, ISO etc	2	0
22	G7 (b) & G8	Introduction to RAM-Reliability Models,MTBF, MTBR Calculations and concept, Data acquisition, collection & statistical analysis	2	0
23	G10 & E.L.	Mgmt Subjects- Interpersonal Relations, Communication Skills, Stress Mgmt, Health/ Nutrition, Extension Lectures etc.	12	0
		Total	200	500

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	TB5,TB6,TC1	3	100
Exam-II	TCS1,TCS2,TCS3, TCS4,TCS5	3	100
Exam-III	TC6, TCT2,TCT3	3	100
Exam-IV	TA2,TCT1	3	100
Exam-V	S1,S8,S22	3	100
	Total	15	500

E. Practicals

Sl.No.	Name of Lab	Hours	Marks
1	Signalling Labs	12	---
2	Train Traffic Control Lab (Electronics)	4	25
3	Train Traffic Control Lab (Control)	18	25
4	Out door Telecom Lab (Cables)	16	50
5	Telephony Lab	30	100
6	Transmission Systems Lab	40	100
7	Networking Lab	30	100
8	Computer Lab	04	--
	Total	154	400

F. Practical Examinations

Sl.No	Name of the Lab	Type	Hours	Marks
1	Train Traffic Control Lab (Control)	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	50
2	Outdoor Telecom Lab (Cables)		4	50
3	Telephony Lab		4	100
4	Transmission Systems Lab (DMW)		4	100
5	Networking Lab		4	100
	Total		20	400

G. Miscellaneous

Sl.No.	Description	Hours
1	Project work assignment	4

H. CD Spare

Sl.No.	Description	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	24

13.2 Overview of Phase-II – ITJE/02

A. Course Program: 14 Weeks

Sl.No.	Details	Hours
1	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2	THEORY	242
3	THEORY EXAMINATION	15
4	PRACTICALS	98
5	PRACTICAL EXAMINATION	20
6	MISCELLANEOUS (STUDY TOUR (OPTIONAL) & PROJECTS EVALUATION)	18
7	CD-SPARE	24
Total		420 Hrs

B. Summary Of Evaluation

Sl.No	Topic	Hours	Marks
1	THEORY	15	500
2	PRACTICAL	20	300
3	PROJECT WORK	12	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			1000

C. Theory

Sl. No.	Code	Subject	Hours	Marks
1	TB1	Telecom General Part II	12	30
2	TC2	Public Address system	08	20
3	TC3	Passenger Information System & ISS	14	30
4	TC4	Power Supply Arrangements	14	40
5	TCT5	SDH Principles	22	50
6	TCT6	SDH Equipment	20	50
7	TA1	Mobile Communication	22	60
8	TA3	Data Networks of IR	12	40
9	TCT4	OFC Systems	18	60
10	TC5	Earthing & surge protection for Telecom. Installations	08	20
11	G1	Vigilance	02	0
12	G3	Tenders & Contracts	16	30
13	G5	Establishment & DAR	16	40
14	G6	Accounts & Stores	16	30
15	G9	Disaster Management Communications	08	0
16	G10 & E.L.	Mgmt Subjects- Time & Mind management, Group Coordination, Motivation, Organizational behavior, Ethics in workplace, Health Issues (Heart & Diabetes)	16	0
17		SACFA clearances/RCIL/IRPMU/CRIS etc.	10	0
18		Recent Circulars / Trainee's Choice	8	0
		Total	242	500

D. Theory Examination

Sl. No	Exam	Subjects	Hours	Marks
1	Exam-I	TB1,TC2,TC3,TC5	3	100
2	Exam-II	TCT5,TCT6	3	100
3	Exam-III	TA1,TC4,	3	100
4	Exam-IV	TA3,TCT4	3	100
5	Exam-V	G3,G5,G6	3	100
		Total	15	500

E. Practicals

Sl.No.	Experiments	Hours	Marks
1	Passenger Information System Lab.	12	50
2	Outdoor Telecom Lab	08	50
3	Transmission Systems Lab (OFC)	20	100
4	Transmission Systems Lab (SDH)	34	
5	Transmission Systems Lab (NMS)	16	
6	Networking Lab	08	100
Total		98	300

F. Practical Examinations

Sl.No.	Name of the Lab	Type	Hours	Marks
1	Passenger Information System Lab.	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	50
2	Outdoor Telecom Lab		4	50
3	Transmission Systems Lab (OFC), (SDH)		8	100
4				
5				
6	Networking Lab		4	100
Total			20	300

G. Miscellaneous

Sl.No	Details	Hours
1	Study Tour (Optional)	6
2	Project Presentation	12
Total		18

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	24

14.0 INITIAL COURSE FOR PROMOTED JE/TELE (INTERMEDIATE)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	PHASE I : 06 WEEKS	1600
		PHASE II: 06 WEEKS	
		(Sub-Total): 12 weeks	
FIELD TRAINING	ZONAL RAILWAYS	22 WEEKS	600
TOTAL		34 WEEKS	2200

14.1 OVERVIEW OF PHASE-I – ITIN/01

A. Course Program: 6 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	65
3.	THEORY EXAMINATIONs	12
4.	PRACTICALS	76
5.	PRACTICAL EXAMINATIONs	10
6.	MISCELLANEOUS (Project Presentations)	02
7.	CD SPARE	12
Total		180 Hrs

B. Summary Of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	12	400
2	PRACTICAL	10	250
3	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			750

C. Theory

Sl. No.	Code	Subject	Hours	Marks
1	TC1	Telecom Cables (Copper)	6	40
2	TCS1	Telephone Instruments	2	20
3	TCS4	ISDN Exchange and Advancements	8	60
4	TCS5	Signalling in Telecommunications	2	20
5	TCS6	IP Telephony & NGN	4	30
6	TCT2	PDH Principles	8	50
7	TCT3	PDH Equipments	8	50
8	TC6	Train Traffic Control	8	60
9	TA2	Data communication & Networking	14	70
10	G10	Personality development, Communication Skills	5	--
11	G11	Etiquette, Conduct, Ethics, Gender Sensitization, Personal Safety etc		
Total			65	400

D. Theory Examination

Sl. No.	Subjects	Hours	Marks
Exam-I	TC1 & TC6	3	100
Exam-II	TCS1, TCS4 & TCS5	3	100
Exam-III	TCT2 & TCT3	3	100
Exam-IV	TA2 & TCS6	3	100
Total		12	400

E. Practical

Sl.No.	Lab	Hours	Marks
1	Train Traffic Control Lab	16	50
2	Out Door Telecom Lab	12	50
3	Telephony Lab	18	50
4	Transmission Systems Lab(MUX)	16	50
5	Network Lab	14	50
Total		76	250

F. Practical Examinations

Sl.No.	Lab	Type	Hours	Marks
1	Train Traffic Control Lab	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	02	50
2	Out Door Telecom Lab		02	50
3	Telephony Lab		02	50
4	Transmission Systems Lab(MUX)		02	50
5	Network Lab		02	50
Total			10	250

G. Miscellaneous

Sl.No	Details	Hours
1	Project Presentation	02
Total		02

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Library, Group Discussion, Extra hours for any subject etc	12

14.2 Overview of Phase-II – ITIN/02

A. Course Program: 6 Weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	102
3.	THEORY EXAMINATION	14
4.	PRACTICALS	40
5.	PRACTICAL EXAMINATIONS	08
6.	MISCELLANEOUS (Project Presentations)	08
7.	CD SPARE	05
Total		180 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	14	450
2	PRACTICAL	08	200
3	PROJECT WORK	08	100
4	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
5	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			850

C. Theory

Sl.No.	Code	Subject	Hours	Marks
1	TC2	Public Address System	04	30
2	TC3	Passenger Information System (PIS)	06	40
3	TC4	Power Plant practice	08	40
4	TCT5	SDH Principles	14	60
5	TCT6	SDH Equipment	08	40
6	TA1	Mobile Communications	14	60
7	TA3	Data Networks of IR	06	20
8	TCT4	OFC Systems	12	60
9	TC5	Earthing & Surge Protection for Telecom.	04	40
10	S1	Basic concepts of signalling	04	20
11	G1	Vigilance	02	0
12	G2	Official Language	02	0
13	G3	Tenders & Contracts	04	20
14	G5	Establishment Matters	04	20
15	G6	Accounts & Stores	02	10
16	G9	Disaster management communication	02	0
17	G10 & EL	First Aid ,Fire Fighting, Stress Mgt, Health/Nutrition etc	6	--
Total			102	450

D. Theory Examination

Sl. No.	Subjects	Hours	Marks
Exam-I	TC2,TC3 &,TC5	3	100
Exam-II	TC4 & TCT4	3	100
Exam-III	TCT5 & TCT6	3	100
Exam-IV	TA3,TA1 & S1	3	100
Exam-V	G3,G5 & G6	2	50
Total		14	450

E. Practical

Sl.No.	Lab	Hours	Marks
1	Transmission Systems Lab (MUX)	20	100
2	Network Lab	14	16
3	Passenger Information System	04	25
4	Computer Lab	02	--
Total		40	200

F. Practical Examination

Sl.No.	Lab	Type	Hours	Marks
1	Transmission Systems Lab (MUX)	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100
2	Network Lab		3	75
3	Passenger Information System		1	25
Total			08	200

G. Miscellaneous

Sl.No	Details	Hours
1	Project Presentation	08
Total		08

H. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Library, Group Discussion, Extra hours for any subject etc	05

15.0 REFRESHER COURSE FOR SSE/JE (TELECOM)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	IRISET	04 WEEKS	200

A. Course Program - RTSJE

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	2
2.	THEORY	71
3.	PRACTICALS	38
4.	THEORY EXAMINATION	3
5	CD SPARE	6
Total		120

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	03	100
2	TRAINEE'S CONDUCT IN HOSTELS AND CLASSROOMS.	--	50
3	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			200

C. Theory

Sl.No.	Subject Code	Subject	Hours	Marks
1	TC3	Passenger Information System	04	10
2	TC4	Power Supply Arrangement	02	--
3	TCS4	ISDN Exchange, IP telephony and Advancements	06	10
4	TCT2	PDH Principles	04	10
5	TCT3	PDH Equipments		
6	TCT5	SDH Principles	04	15
7	TCT6	SDH Equipment including TJ1400	06	
8	TC6	Train Traffic Control	04	10
9	TA1	Mobile Communication	06	10
10	TA2	Data communication & Networking/security/NGN	09	20
11	TA3	Data Networks of IR		
12	TCT4	OFC Systems	06	10
13	TC5	Earthing & surge protection for Telecom. Installations	02	05
14	G9	Disaster Management Communications	02	0
15	G4A	First Aid	02	0
16	G4 B	Fire Fighting	02	0
17	G3	Tenders & Contracts	02	0
18	G5	Establishment & DAR	02	0
19	G6	Accounts & Stores	02	0
20	TC1	Telecom Cables (Copper)	02	0
21	S1	Basic Concepts of Signaling	01	0
22	S28	Dataloggers	01	0
23	G12	Gender Sensitisation	02	0
		Total	71	100

D. Theory Examination

Exam	Type	Hours	Marks
Exam-I	Subjective + Objective	2	100
Exam-II	Objective	1	
	Total	3	100

E. Practicals

Sl.No.	Name of Lab	Hours
1	TRAIN TRAFFIC CONTROL	2
2	OUT DOOR TELECOM (Cables)	2
3	PASSENGER INFORMATION SYSTEM	2
4	TELEPHONY	6
5	TRANSMISSION SYSTEM (OFC)	18
6	NETWORKING	6
7	COMPUTER	2
	Total	38

F. CD Spare

Sl.No	Details	Hours
1	Holidays, Local Visit, Shramdaan, Social service, Extra hours for any subject etc	6

**COURSES FOR TECHNICIAN
TELECOM**

**16.0 INITIAL COURSE FOR APPRENTICE TECHNICIAN (TELECOM)
Gr III**

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	PHASE I : 08 WEEKS	500
		PHASE II: 09 WEEKS	500
		(Sub-Total): 17 WEEKS	1000
FIELD TRAINING	ZONAL RAILWAYS	35 WEEKS	500
TOTAL		52 WEEKS	1500

16.1 OVERVIEW OF PHASE-I – SNT3

A. Course Program – 8 weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	154
3	THEORY EXAMINATIONS	9
4.	PRACTICALS	100
5.	PRACTICAL EXAMINATIONS	4
6.	MISCELLANEOUS (Study Tour-Optional)	6
7.	CD SPARE	12
Total		288 Hrs

B. Summary of Evaluation :

Sl.No	Topic	Hours	Marks
1	THEORY	9	300
2	PRACTICAL	4	100
3	TRAINEE'S CONDUCT IN CLASS ROOM & HOSTEL	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
Total			500

C. Theory:

Code	Subject	Hours	Marks
ST-01	General (Organization of Railway, Structure of S&T)	6	20
ST-02	Cleanliness, Personal Safety, Fire Prevention, First Aid	4	10
ST-03(b)	Measuring Instruments including OFC equipments, Use of Hand and Portable Tools, Cable Route Locators	20	30
ST-05	Basic Electricity and Magnetism	8	30
ST-06	Disaster Management, Schedule of Dimensions Safety in Train-operation	8	10
ST-04	Power Equipment Cells & Battery	20	40
ST-08	Cables	20	30
ST-09	Electronic components	16	30
ST-07	Computer Applications & IP Networks (Basic)	14	40
ST-51	Amplifiers, Oscillators, Modulation and demodulation	20	20
ST-56	VHF Systems	18	40
	Total	154	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	ST-01,02,03,05,06	03	100
Exam-II	ST-04,08,09	03	100
Exam-III	ST-07,51,56	03	100
	Total	09	300

E. Practicals

Sl.No.	Lab	Hours
1	Measuring Instruments	14
2	Power Equipments	12
3	Basic Electricity & Magnetism	12
4	Disaster Management	04
5	Computer Appreciation	18
6	Telecom Cables	18
7	Electronic Components	14
8	Electronic Circuits	08
	Total	100

F. Practical Examination

Sl No	Labs	Type	Hours	Marks
1	Practical	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl No	Item	Hours
1	Study Tour (Optional)	6

OVERVIEW OF PHASE-II

A. Course Program : 9 weeks

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	150
3	THEORY EXAMINATION	9
4.	PRACTICALS	133
5.	PRACTICAL EXAMINATION	4
6.	MISCELLANEOUS(Study Tour-Optional)	12
7.	CD SPARE	13
	Total	324

B. Summary of Evaluation:

Sl..No.	Topic	Hours	Marks
1	THEORY EXAM	9	300
2	PRACTICAL EXAM	4	100
3	TRAINEE'S CONDUCT IN CLASS ROOM & HOSTEL	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total		500

C. Theory:

Code	Subject	Hours	Marks
ST-10	Telephone Instruments (Exchange IP & non IP)	12	10
ST-45	Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	12	30
ST-46	Electronic and IP Exchange	18	40
ST-47	Tetra, GSM-R and LTE	12	20
ST-48	Railnet, Wi-Fi System, PRS, UTS & FOIS	12	30
ST-49	Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	12	30
ST-50	Optic Fibre Communication, SDH & Equipments	12	30
ST-52	Digital Fundamentals & Applications	12	10
ST-53	Emergency Communication	12	10
ST-54	Basics of Satellite Technologies, VSAT & Disaster Management Communication	12	30
ST-55	IP based Video Surveillance System & ISS	12	30
ST-57	Advance IP Network, NMS & Security of Network	12	30
	Total	150	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-IV	ST-10,45,46,47	03	100
Exam-V	ST-48,49,50,52	03	100
Exam-VI	ST-53,54,55,57	03	100
	Total	09	300

E. Practicals

Sl.No.	Lab	Hours
1	Telephone Instruments (Exchange – IP & Non IP)	5
2	DTMF HQ/Waystation Equipment, Train Traffic Control (RE/Non-RE) and VoIP based Control Communication	15
3	Passenger Amenities (PA System, PIS, IPIS & GPS Clock)	15
4	Study of 5 W/25W VHF set	5
5	Digital Logic Gates	5
6	Electronic Exchange & IP Exchange	10
7	Tetra, GSM-R & LTE	6
8	Railnet, Wi-Fi System, PRS, UTS, & FOIS	10
9	Optic Fiber Communication, SDH & Equipments	15
10	Digital Fundamentals and Applications	5
11	Emergency Communications	5
12	Basics of Satellite Technology, VSAT and Disaster Management Communications	10
13	IP based Video Surveillance System & ISS	15
14	Advance IP Network, NMS & Security of Network	12
	Total	133

F. Practical Examination

Sl. No	Lab	Type	Hours	Marks
1	Practical	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl. No	Item	Hours
1	Study Tour (Optional)	12

17.0 REFRESHER COURSE FOR TECHNICIAN (TELECOM)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	4 weeks	200

A. Course Program – SNT-5.

Sl.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	72
3.	THEORY EXAMINATION	3
4.	PRACTICALS	50
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS(Study Tour-Optional)	6
7.	CD SPARE	6
	Total	144

B. Summary of Evaluation:

S. NO	Topic	Hours	Marks
1	THEORY	03	100
2	PRACTICAL	04	80
3	TRAINEE'S CONDUCT IN CLASS ROOM & HOSTEL	--	10
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	10
	Total	07	200

C. Theory:

Code	Subject	Hours	Marks
ST-03	Measuring Instruments including OFC equipments, Use of Hand and Portable Tools, Cable Route Locators	06	6
ST-04	Power equipments, Cells and Battery	06	8
ST-05	Basic Electricity and Magnetism	05	4
ST-06	Safety in Train Operation, Schedule of Dimensions, Disaster Management	02	4
ST-08	Cables	06	8
ST-10	Telephone Instruments (Exchange IP & non IP)	06	8
ST-45	Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	06	8
ST-46	Electronic and IP Exchange	06	8
ST-47	Tetra, GSM-R and LTE	02	3
ST-48	Railnet, Wi-Fi System, PRS, UTS & FOIS	03	8
ST-49	Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	04	5
ST-50	Optic Fibre Communication, SDH & Equipments	06	10
ST-53	Emergency Communication	03	2
ST-54	Basics of Satellite Technologies, VSAT & Disaster Management Communication	03	4
ST-55	IP based Video Surveillance System & ISS	05	10
ST-56	VHF Systems	03	4
	Total	72	100

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	All Subjects	03	100

E. Practicals

S.No.	Lab	Hours
1	Study of Resistor	2
2	Study of Megger	2
3	Study of TMS kit	2
4	Study of Earth Tester	2
5	Study of Selective Calling Phone	2
6	Study of Electronic LC gate	2
7	Study of Telephone Instruments (Exchange- IP & Non IP)	2
8	Study of Electronic Exchange & IP Exchange	4
9	Study of Train Traffic Control (RE/Non-RE) & VoIP Based Control Communication	4
10	Study of Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	4
11	Study of Tetra, GSM-R and LTE	2
12	Railnet, Wi-Fi System, PRS, UTS & FOIS	4
13	Study of 5W/25W VHF Set	2
14	Study of Optic Fibre Communication, SDH & Equipments	4
15	Study of IP based Video Surveillance System & ISS	4
16	Study of Advance IP Network, NMS & Security of Network	4
17	Study of Basics of Satellite Technologies, VSAT & Disaster Management Communication	2
18	Study of Emergency Communication	2
	Total	50

F. Practical Examination

Sl No	Labs	Type	Hours	Marks
1	All Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	80

G. Miscellaneous

Sl No	ITEM	HOURS
1	Study Tour (Optional)	6

**18.0 FOUNDATION COURSE FOR PROMOTEE TECHNICIAN
(TELECOM) Gr.III**

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	8 weeks	500

A. Course Program – SNT10.

S.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	128
3	THEORY EXAMINATION	9
4.	PRACTICALS	120
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS(Study Tour-Optional)	12
7	CD SPARE	12
	Total	288 Hrs

B. Summary of Evaluation:

SL NO	Topic	Hours	Marks
1	THEORY	09	300
2	PRACTICAL	04	100
3	TRAINEE'S CONDUCT IN CLASS ROOM & HOSTEL	--	50
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	50
	Total	13	500

C. Theory:

Code	Subject	Hours	Marks
ST-01	General	2	5
ST-03(b)	Measuring Instruments including OFC equipments, Use of Hand and Portable Tools, Cable Route Locators	8	10
ST-04	Power equipment, Cells and Battery	6	15
ST-05	Basic Electricity and Magnetism	8	10
ST-07	Computer Appreciation	6	30
ST-08	Cables	6	30
ST-09	Electronic Components	6	6
ST-10	Telephone Instruments (Exchange IP & non IP)	12	12
ST-45	Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	12	18
ST-46	Electronic and IP Exchange	8	24
ST-47	Tetra, GSM-R and LTE	6	10
ST-48	Railnet, Wi-Fi System, PRS, UTS & FOIS	10	24
ST-49	Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	10	24
ST-50	Optical Fiber Communication	10	24
ST-53	Emergency Communication	4	10
ST-54	Basics of Satellite Technologies, VSAT & Disaster Management Communication	4	6
ST-55	IP based Video Surveillance System & ISS	4	12
ST-56	VHF System	6	30
Total		128	300

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	ST-01, 03, 04, 05, 07 & 08	03	100
Exam-II	ST-,09, 10, 45, 48, 53 & 56	03	100
Exam-III	ST- 46, 47, 49, 50, 54 & 55	03	100
Total		09	300

E. Practicals

Sl.No.	Name of Lab	Hours
1	Telecom Cables, OFC, OTDR	8
2	Measuring Instruments	8
3	Electronic Components	4
4	Basic Electricity & Magnetism	4
5	Power Equipments, Cell & Batteries	4
6	Telephone Instruments (Exchange IP & non IP)	6
7	Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	8
8	Tetra, GSM-R and LTE	6
9	Railnet, Wi-Fi System, PRS, UTS & FOIS	8
10	Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	8
11	IP based Video Surveillance System & ISS	8
12	Optic Fibre Communication, SDH & Equipments	8
13	VHF Set (5Watt/25Watt)	6
14	Electronic and IP Exchange	8
15	Emergency Communication	6
16	Computer Appreciation	6
17	Basics of Satellite Technologies, VSAT & Disaster Management Communication	6
18	Networking System, Advance IP Network, NMS & Security of Network	8
	Total	120

F. Practical Examination

Sl. No.	Labs	Type	Hours	Marks
1	All Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	100

G. Miscellaneous

Sl No	Item	Hours
1	Study Tour (Optional)	12

19.0 REFRESHER COURSE FOR HELPERS (TELECOM)

Nature of Training	Training at	Duration	Marks
INSTITUTIONAL TRAINING	STTC	2 weeks	200

A. Course Program-SNT6B

S.No	Details	Hours
1.	BRIEFING, REGISTRATION & OPEN HOUSE DISCUSSION	3
2.	THEORY	20
3	THEORY EXAMINATION	3
4.	PRACTICALS	39
5.	PRACTICALS EXAMINATION	4
6.	MISCELLANEOUS (Study Tour-Optional)	0
7.	CD SPARE	3
	Total	72

B. Summary of Evaluation:

S. NO	Topic	Hours	Marks
1	THEORY	03	100
2	PRACTICAL	04	80
3	TRAINEE'S CONDUCT IN CLASS ROOM & HOSTEL	--	10
4	TRAINEE'S PARTICIPATION IN EXTRA CURRICULAR ACTIVITIES	--	10
	Total	07	200

C. Theory:

Code	Subject	Hours	Marks
ST-03(c)	Measuring Instruments including OFC equipments, Use of Hand and Portable Tools, Cable Route Locators	2	6
ST-04	Power equipments, Cells and Battery	2	8
ST-05	Basic Electricity and Magnetism	1	4
ST-06	Safety in Train Operation, Schedule of Dimensions, Disaster Management	1	4
ST-08	Cables	1	8
ST-10	Telephone Instruments (Exchange IP & non IP)	1	8
ST-45	Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	2	8
ST-46	Electronic and IP Exchange	2	8
ST-47	Tetra, GSM-R and LTE	1	3
ST-48	Railnet, Wi-Fi System, PRS, UTS & FOIS	1	8
ST-49	Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	1	5
ST-50	Optic Fibre Communication, SDH & Equipments	1	10
ST-53	Emergency Communication	1	2
ST-54	Basics of Satellite Technologies, VSAT & Disaster Management Communication	1	4
ST-55	IP based Video Surveillance System & ISS	1	10
ST-56	VHF Systems	1	4
	Total	20	100

D. Theory Examination

Exam	Subjects	Hours	Marks
Exam-I	All Subjects	03	100

E. Practicals

S.No.	Lab	Hours
1	Study of Resistor	2
2	Study of Megger	2
3	Study of TMS kit	2
4	Study of Earth Tester	2
5	Study of Selective Calling Phone	2
6	Study of Electronic LC gate	2
7	Study of Telephone Instruments (Exchange IP & non IP)	2
8	Study of Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	2
9	Study of Electronic and IP Exchange	2
10	Study of Tetra, GSM-R and LTE	2
11	Study of Railnet, Wi-Fi System, PRS, UTS & FOIS	2
12	Study of 5W/25W VHF Set	2
13	Study of Train Traffic Control [RE/NON-RE] & VOIP based Control Communication	4
14	Study of Optic Fibre Communication, SDH & Equipments	3
15	Study of Emergency Communication	2
16	Study of Basics of Satellite Technologies, VSAT & Disaster Management Communication	2
17	Study of IP based Video Surveillance System & ISS	2
18	Study of Networking System, Advance IP Network, NMS & Security of Network	2
	Total	39

F. Practical Examination

Sl No	Labs	Type	Hours	Marks
1	Practicals	Record Sheets (20%) Experiment (50%) Viva-voce (30%)	4	80

ANNEXURES

INDEX OF SUBJECTS

INDEX OF SUBJECTS-IRISET**ANNEXURE-1****SIGNALLING SUBJECTS**

Sl No	CODE	NAME OF SUBJECT
1	S1	Basics of Signal Engineering
2	S2	Principles of Interlocking
3	S3	Mechanical Signalling - Single Wire & Rodding
4	S4	Mechanical Signalling - Double Wire
5	S5	Locking Table
6	S6	Locking Chart
7	S7	Signalling in 25KV AC Electrified Section
8	S8	Signalling General
9	S9	Power Supply for Signalling
10	S10	Colour Light and Automatic Signalling
11	S11	Control and Selection Table
12	S12	Relay Interlocking - Metal to Carbon Relays (British)
13	S13	Circuit Practices - British
14	S14	Relay Interlocking - Metal to Metal Relays (Siemens)
15	S15	Panel Interlocking with Metal to Metal Relays (Siemens)
16	S16	RRI Siemens
17	S17	Circuit Practice - Siemens
18	S18	Electronics Interlocking
19	S19	Signalling Relays and Cables
20	S20	Reversors, Slot Circuit, Lifting Barriers & Key Transmitter
21	S21	Electric Point Machine & Signal Machine
22	S22	BLOCK Working - SL Toekn and DL Block Instruments
23	S23	Tokenless Block Instrument for Single Line
24	S24	Intermediate Block Signalling, Block Working - Axle Counters
25	S25	Train Detection - Track Circuits
26	S26	Train Detection Devices - Axle Counters - Analog & Digital
27	S27	Signalling Safety & Case Studies
28	S28	Data Loggers, TPWS & ETCS
29	S29	Railway Signalling - Construction Practices
30	S30	Signalling Data Handbook

TELECOM SUBJECTS

SI No	CODE	NAME OF SUBJECT
1	THB	Telecom Hand Book
2	TA1	Mobile Communication
3	TA2	Data Networks
4	TA3	Data networks of IR
5	TA4	Cyber Security
6	TB1	Telecom General
7	TB3	Digital Electronics
8	TB4	Digital Modulation Technique
9	TB5	Radio propagation
10	TB6	Measuring Instruments
11	TC1	Telecom Cables (Copper)
12	TC2	Public Address System
13	TC3	Passenger Information System
14	TC4	Power Supply Arrangements
15	TC5	Earthing and Surge Protection
16	TC6	Train Traffic Control
17	TCS1	Telephone Instruments
18	TCS2	Principles of Electronic Exchanges
19	TCS4	ISDN Exchange and Advancements
20	TCS5	Signalling in Telecommunications
21	TCS6	IP Telephony and NGN
22	TCT1	Digital Radio Equipment
23	TCT2	PDH Principles
24	TCT3	PDH Equipment
25	TCT4	OFC Systems
26	TCT5	SDH Principles
27	TCT6	SDH Equipment

GENERAL SUBJECTS

Sl No	CODE	NAME OF SUBJECT
1	G1	Vigilance
2	G2	Official Language
3	G3	Tenders & Contracts
4	G4(A)	First Aid
	G4(B)	Fire Fighting
5	G5	Establishment Matters
6	G6	Accounts & Stores
7	G7 (A)	Quality Standards/CENELEC, ISO
	G7 (B)	Introduction to RAM-Reliability Models
8	G8	Predictive & Preventive, Maintenance, MTBF,MTTR Calculations
9	G9	Disaster Management
10	G10	Personality Development & Communication Skills
11	G11	General topic for all Initial Courses (Etiquette, Conduct, Ethics, Personal Safety)
12	G12	Gender Sensitization & Relevant Acts

**COURSE CONTENT FOR TRAINING MODULES
OF
GROUP “C” TECHNICIANS & ERSTWHILE
GROUP “D” STAFF OF
S&T DEPARTMENT**

Module Index

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ST-03(b)	Measuring instruments including OFC equipments, Use of hand and portable tools, Cable Route Locators	Technician (Tele)	108
ST-03(c)	Measuring Instruments, Use of hand and Portable tools.	Helpers	109
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ST-05	Basic Electricity and Magnetism	Technician (Signal)/Technician (Tele)	112
ST-06	Safety in Train Operation, Schedule of Dimensions & Disaster Management	Technician (Signal)/Technician (Tele)	113
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ST-08	Telecom cables	Technician (Tele)	115
ST-09	Electronic component	Technician (Tele)	116
ST-10	Telephone instruments	Technician (Signal)/Technician (Tele)	117
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ST-16	Orthodox Signaling	Technician (Signal)	119
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ST-18	Inter slotting, Electrical Key Transmitter, Electrical Detector	Technician (Signal)	121
ST-19	Relays & Cables	Technician (Signal)	122
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ST-24	Axle Counter & Block Proving by Axle Counter(BPAC)	Technician (Signal)	128
ST-25(a)	Single line Token Block Instrument	Technician (Signal)	129

TRAINING MODULES OF GR-C & D STAFF OF S & T DEPT.

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ST-45	Passenger Amenities (PA, PIS, IPIS & GPS clock)	Technician (Tele)	140
ST-46	Electronic and IP Exchange	Technician (Tele)	141
ST-47	Tetra, GSM-R and LTE	Technician (Tele)	142
ST-48	Railnet, Wi-Fi System, PRS, UTS & FOIS	Technician (Tele)	143
ST-49	Train Traffic Control [RE/NON RE] & VoIP based Control Communication	Technician (Tele)	144
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ST-52	Digital Fundamentals & Applications	Technician (Tele)	147
ST-53	Emergency Communication	Technician (Tele)	148
ST-54	Basics of Satellite Technologies, VSAT & Disaster Management Communication	Technician (Tele)	149
ST-55	IP based Video Surveillance System & ISS	Technician (Tele)	150
ST-56	VHF Systems	Technician (Tele)	151
ST-57	Advance IP Network, NMS & Security of Network	Technician (Tele)	152
ST-65	Establishment, Stores, Signal Engineering Manual, Telecom Engineering Manual, General & Subsidiary Rule	Technician (Tele) Technician (Signal)	153

ST/01

FOR ALL

Description: General	
CONTENTS	
1	Organization of Railways
2	Structure of S&T Department
3	Duties of staff 1. Supervisors 2. Maintainers 3. Helpers 4. Clerks
4	HOER, WCA, P.W.ACT, Leave
5	Pass rules, Medical, Channel of promotion and promotion policies
6	Labour Organization and PREM
7	DA Rules & Conduct Rules
8	Maintenance of Stores
9	Family Welfares
10	Abbreviations & Symbols

ST/02

FOR ALL

Description: Cleanliness, Personal Safety, Fire Prevention, First Aid	
CONTENTS	
1	Knowledge and Cleanliness of Work Place, Store, Tools etc.
2	Knowledge about usage of uniform, personal safety appliances & their usage and usage of vacuum cleaner.
3	Cause of fire in various places, fire fighting.
4	Types of fire extinguishers and their usage.
5	Knowledge of fire detection, alarm system and fire fighting agency
6	Knowledge of Automatic Fire suppression system and its maintenance.
7	Procedure to be followed to avoid fire accident on human body
8	Precautions to be taken during fire accident on human body
9	First aid :
	Aim and first aid
	Dressing and slings
	Wounds and hemorrhage
	Electric shock
	Poisons, gases and acids
	Artificial respiration
	Transport of casualties.
	For fire accident.
10	Knowledge about transportation, storing consumables, perishables, inflammable and fragile stores
11	Prevention of damage due to storm, rain, corrosion and fire

SKILL:

1	Usage of fire extinguishers.
2	First Aid

ST/03 (a)

FOR TECHNICIAN (SIGNAL)

Description: Measuring instruments and use of hand and portable tools	
CONTENTS	
1	Voltmeter
2	Ammeter
3	Analog & Digital Multimeter
4	Analog and Digital Megger.
5	Oscilloscope
6	Frequency Meter
7	Earth leakage detector
8	Earth Measuring Meter
9	Cable fault Locator
10	Cable route tracer
11	Clamp Meters
	a) Use of Hammer, chisel, wrench, spanner, box spanner, screw drivers and precautions using them
	b) Use of electric and mechanical drills, grinders, vacuum blowers, cleaners, principle of their work-adjustment
	c) Soldering iron and soldering technique

SKILL

1	Usage of Meter
2	Usage of the tools

ST/03(b)

FOR TECHNICIAN (TELE)

Description: Measuring Instruments including OFC equipments, Use of Hand and Portable Tools, Cable Route Locator	
CONTENTS	
1	Voltmeter, Ammeter
2	Analog & Digital Multimeter
3	Megger
4	Oscilloscope
5	TMS Kit
6	Attenuation Meter
7	Splicing Machine
8	OTDR - Optical Time - Domain Reflectometer
9	VFL - Visual Fault Locator
10	Optical Power Meter, LED,LASER Source, PIN & APD
11	Fiber stripper, crimping tool, Cleaver, FDMS, KRONE tool, wrapping tool
12	Cable fault locator, Cable Route tracer
13	DTA
14	EI Tester
15	Psopho Meter
16	LCR (Inductance, Capacitance & Resistance) Meter
17	Power Meter
18	Selective Level Meter
19	DB Meter
20	IC Tester
21	Vernier caliper, Spirit-level Pumping
22	Frequency Meter
23	Earth leakage detector
24	Earth Measuring Meter
25	a) Use of hammer, chisel, wrench, spanner, box spanner, screw drivers and precautions while using them.
	b) Use of Electric Drills, grinders, vacuum blowers, cleaners, principles of their working and adjustment.
	c) Soldering iron and soldering techniques.

SKILL:

1	Usage of the meters.
2	Usage of the Tools.

ST/03 (c)

FOR HELPERS

Description : Measuring instruments and use of hand and portable tools	
CONTENTS	
1	Voltmeter
2	Ammeter
3	Analog & Digital Multimeter
4	Analog and Digital Megger
5	Earth leakage detector
6	Earth Measuring Meter
7	Cable fault Locator
8	Cable route tracer
9	Clamp Meters
10	a) Use of Hammer, chisel, wrench, spanner, box spanner, screw drivers and precautions using them
	b) Use of electric and mechanical drills, grinders, vacuum blowers, cleaners, principle of their work-adjustment
	c) Soldering iron and soldering technique

SKILL:

1	Usage of the Meter.
2	Usage of the Tools.

ST/04 FOR TECHNICIAN (SIGNAL)/TECHNICIAN (TELE)

Description : Power Equipments, Cells And Battery, Integrated Power Supply, Dg Set & Solar Panel	
CONTENTS	
1	Types of primary and secondary cells
2	Construction of primary and secondary cells
3	Testing and maintenance of primary and secondary cells
4	Initial charging and installation of secondary cells
5	Initial/Float/Boost/Trickle charging of secondary cells- Adjustment of charging rate
6	Various defects in secondary cells and their prevention.
7	Manual and Automatic chargers-Installation, Adjustment, Capacity- Trouble Shooting
8	TECHNICIAN (SIGNAL)PS chargers working principle, installation, capacity and trouble shooting
9	Different types of Transformer- working principle, parameters, capacity, usage, trouble shooting.
10	Study of different types of inverter, stabilizer- working principle, parameters, capacity, usage, trouble shooting.
11	Uninterrupted Power Supply- working principle, parameters, capacity, usage, trouble shooting.
12	Integrated Power Supply- working principle, parameters, capacity, usage, trouble shooting.
13	DC-DC Converter, AC-DC Converter- working principle, parameters, capacity, usage, trouble shooting.
14	Typical power plant arrangement at
	a) Panel Interlocking Station for Technician (Signal)
	b) Telephone Exchange for Technician (Tele)

DIESEL GENERATOR SET

1	Types of DG set
2	Working of Diesel engine
3	Types of ignition and working of fuel injection system
4	Starting procedure and remote starting
5	Recommended maintenance schedule/procedure
6	Engine trouble shooting, air filtering fuel system
7	Alternator, excitation voltage control
8	Precautions/procedure for storing HSD and lubricating oil
9	Portable generators

SOLAR PANEL

1	Explanation about solar power
2	Construction of solar photo voltaic panel uses
3	Type of silicon used- advantages comparisons with other sources of supply
4	Solar panel- signal lighting- twilight switching, solar panel- for other signaling circuit
5	Choice of batteries and capacity
6	Installation, maintenance, precautions of solar panel

SKILL

1	Adjustment of Battery Chargers- Manual, Automatic.
2	Measurement of various parameters of the equipments
3	Maintenance of cells.
4	Measurement of solar panel

ST/05 FOR TECHNICIAN (SIGNAL)/TECHNICIAN (TELE)

Description : Basic Electricity And Magnetism	
CONTENTS	
1	Idea about EMF, current, power, resistance, inductance, capacitance, power factor etc. and their measurements.
2	Study of Ohms law and its application, series and parallel connections.
3	Importance of insulation resistance
4	Idea about magnetism and magnetic induction.
5	Transformers- working principle, rectifier-working principle.
6	Fuses, surge protection devices and Lightning arrestors.
7	Measurement of loop and insulation resistance of cables and measurement of earth resistance.
8	AC and DC principles.
9	Brief introduction to various Electrical equipments like chargers, stabilizers, transformers, UPS, DC-DC Converter, AC-DC Converter.

SKILL

1	Measurements of Resistance, Voltage, Current.
2	Calculation of Resistance, Voltage, Current.

ST/06 FOR TECHNICIAN (SIGNAL)/TECHNICIAN (TELE)

Description : Safety In Train Operation, Disaster Management, Schedule of Dimensions	
CONTENTS	
1	Knowledge and importance of S&T MR & S&T DN, Maintenance of Signaling equipments
	a) Situation where consent of ASM not necessary
	b) Situation where consent of ASM is necessary
	c) Situation where disconnection memo is required.
2	Duties of Technicians -Technician (Signal)/Technician (Tele) as per SEM, TM
3	Use of detonators, hand signals and banner flag.
4	Provision of speed restriction indicators.
5	Knowledge about keeping distant/Warner signals at 'ON' during disconnection of points & signals
6	Working under integrated/individual blocks.
7	Safety registers to be maintained. (ex. Route cancellation, Axle counter resetting etc.)
8	Responsibility of S&T staff in case of disaster.
9	Provision of PT set at accident site.
10	Sealing of Block Instruments and other equipment as required
11	Assisting the public when warranted.
12	Protection of work site
13	Duties of Maintainer during Maintenance/Failure
14	Precaution while working in RE Area.
15	Safety procedure, accident management, role of S&T staff
16	Safety circulars and instructions pertaining to S&T staff
17	Case study of accidents where S&T is involved
18	Need of schedule of dimensions
19	Schedule of dimensions part I, II,III.
20	Schedule of dimensions applicable to S&T gears.

SKILL

1	Use of hand signals.
2	Use of PT sets.
3	Filling up of Disconnection Memo

ST/07

FOR TECHNICIAN (SIGNAL)/TECHNICIAN (TELE)

Description : Computer Appreciation	
CONTENTS	
1	Computer hardware and interconnections
	a) Identification of CPU mother board, RAM and various computer peripherals like CD ROM, hard disk, key board, mouse, printer, monitor, interface cards, modem, scanners.
	b) Identification of interconnecting cables and interconnections- serial/parallel ports, monitor port, power supply connections, UPS connection, modem connection etc.
2	<u>Operating system function(Window 10 or latest)</u> Starting of Windows, creating files & folders, running programs, copying files, using My computer Icon, Windows Explorer, Control panel and settings, Formatting, finding files, taking print outs, configuring modem adding/removing program etc
3	Software Package-MS Word, MS Excel & MS power point.
4	Basic menu driven commands and application

SKILL

1	Basic working knowledge on the P.C
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ST/08

FOR TECHNICIAN (TELE)

Description : Telecom Cables	
CONTENTS	
1	Different cables used in S&T including OFC cable and cable laying procedure
2	Cable jointing, protection in jointing / FDMS and connecting material
3	Periodical tests on cables, faults, fault localization and rectification
4	Termination of S&T cables including OFC
5	Colour code scheme in telecom cables/OFC identifying pairs/ fibers
6	Study of OFC, jelly filled cable, PCUT cables jointing.
7	Normal joint, loading coil joint, capacitance joint ,T joint, Splice closure and joint practices.
8	Cables used in exchange inside/outside and their periodicals testing. OFC cable testing
9	Soldering/ Splicing

SKILL

1	Soldering / Splicing
2	Cable / Fiber Termination.
3	Cable/ Fiber fault localization.
4	Cable conductor / Fiber identification.

ST/09

FOR TECHNICIAN (TELE)

Description: Electronic Components	
CONTENTS	
1	Passive devices, resistors, capacitors, inductors.
2	Semi conductor diode, its parameters, uses etc.
3	Zener diode and its applications.
4	Special types of diodes used in Wireless.
5	Transistors – FET, BJT, UJT testing and applications.
6	Transistor - field effect and its uses
7	SCR, Diacs, Triacs
8	ICs analog and digital, precautions while handling and testing.
9	Regulated power supplies.
10	DC-DC converter and filter circuits.

SKILL

Assembling and testing regulated power supply using diodes, capacitors, resistors and zener diode.
--

ST/10

FOR TECHNICIAN (SIGNAL)/TECHNICIAN (TELE)

Description : Telephone Instruments	
CONTENTS	
1	Telephone parts, Integrated circuit, buzzer, cadre hook, card etc
2	General defects in telephone instruments
3	Testing and repairing of telephone lines
4	Periodical maintenance of telephone instruments
5	Type of telephones
	5.1 Push button Telephone
	5.2 Hand free Telephone
	5.3 Selective ringing Telephone
	5.4 Wireless Telephone
	5.5 DTMF Telephone
	5.6 Magneto Telephone
	5.7 Control Telephone
	5.8 IP Telephone
	5.9 DKT phone
	5.10 Satellite Phone

SKILL

1	Fault finding and repairing of above telephones
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ST/15

FOR TECHNICIAN (SIGNAL)

Description : Basic Concept Of Signaling	
CONTENTS	
1	Knowledge and necessity of signals- Fail safe feature of signaling system
2	Definition of signaling terms as given in G & SR
3	Concept of LQ, UQ signaling, CLS
4	Location of Signals
5	Subsidiary Signals
6	Markers, Boards, Signs etc.
7	Repeater Signals
8	Overlaps, braking distance, sighting distance.
9	Isolation, slip siding, catch siding
10	Simultaneous reception and dispatch of trains
11	Classification of Stations- Minimum signaling equipments required at each class of station
12	Standard of signaling- Minimum signaling equipments required at each standard of signaling
13	Level Crossing Gates
14	Inter cabin control
15	Block instrument, methods of block working control of outlying siding
16	Signaling Plan
17	Station working rules
18	System of train working

ST/16

FOR TECHNICIAN (SIGNAL)

Description : Orthodox Mechanical Signaling	
CONTENTS	
1	Different lever frames-details
2	Different cranks, joints used in rod transmission
3	Basic knowledge of points, points assembly, type of point switches, point range, facing/trailing points
4	Rod transmission
5	Standard point and crossing layout
6	Requirement before taking over points from Engg. Departments
7	Procedure, precautions while connecting, working on points testing and maintenance.
8	Lock Bars- Procedure, precautions while connecting, working on lock bars, testing and maintenance.
9	Facing point lock- Procedure, precautions while connecting FPL, working on FPL, testing and maintenance.
10	Signal Fittings
11	Wire transmission
12	Rod compensators
13	Detector mechanical (unit detector)
14	Lifting barrier/leaf gates, RDSO boom locking
15	Purpose of providing gate lock with ground control
16	Material required for fixing ground frame
17	Method of interlocking (Electrical/Mechanical)

SKILL

1	Adjustment of point, lock bar, lock and detectors
2	Adjustment of signal

ST/17

FOR TECHNICIAN (SIGNAL)

Description : Signal Reverser, Lever Lock & Circuit Controller, Arm & Light Repeater, Signal Machine	
CONTENTS	
	Reverser
1	Purpose, parts and its functions
2	Installation and adjustment
3	Test to be carried out, Fail safe adjustment
4	Maintenance and trouble shooting
5	LQ/UQ concept, conversion from LQ to UQ & vice versa
	Lever Lock And Circuit Controllers
1	Principle and application of lever locks
2	Various types of lever locks
3	Force drop arrangements
4	Contact adjustment
5	Circuit controllers various types
6	Various bands, cutting/adjustment
	Arm & Light Repeater
1	Purpose, description
2	Elec. Circuit/Mechanical connections
3	Arm indicator, light indicator
4	Wiring, audible warning system
5	Lightening protection, trouble shooting
6	LCDR circuit
	Signal Machine
1	Parts of signal machine
2	Low voltage/high voltage machine
3	LQ type/UQ type
4	General circuit
5	Holding mechanism, snubbing, normal lock clutch
6	Measurement of angles, contact adjustment
7	Measurement of time, voltage, current
8	Testing proper operation and return to normal- maintenance

SKILL

1	Testing and adjustment of reverser for negative test
2	Trouble shooting of reverser, lever lock and Arm and light repeater
3	Testing and adjustment of lever lock for track, indication and back locking
4	Wiring of Signal Machine
5	Trouble shooting of signal machine

ST/18

FOR TECHNICIAN (SIGNAL)

Description : Inter Slotting, Electrical Key Transmitter, Electrical Detector	
CONTENTS	
	Inter Slotting
1	Explanation of inter slot- one slot one train
2	Purpose, various methods, circuitry explanation
3	Cross protection, double cutting
4	Testing of inter slot and fault localization
	Electrical Key Transmitter
1	Explanation of EKT and use
2	Construction
3	Mode of connection
4	Coil used, voltage, resistance, current
5	Circuit controllers various types
6	Mode of connecting a pair
7	Maintenance, testing, trouble shooting and rectification of Electrical and mechanical parts
	Electrical Detectors
1	IRS type ED
2	Combined lock and detectors, different slides
3	Adjustment of detection and cross protection contacts
4	Wiring- 2 wire, 3 wire, 4 wire detection
5	Adjustment of Elec. Detector
6	Fixing of EDS
7	Safety instructions, fail safe adjustment

SKILL

1	Wiring of Electrical detector
2	Adjustment of ED
3	Wiring of EKT
4	Troubleshooting of EKT
5	Conducting one slot one train test

ST/19

FOR TECHNICIAN (SIGNAL)

Description: Relays	
CONTENTS	
1	DC Neutral relays, plug in and shelf type- principle of working, usage
2	Track and line relays
3	AC relays – Principle of working, usage
4	Parameters/ characteristics of all type of relays
5	Polarised relays- Principle of working
6	Plug in type relays- types of relays in used
7	Metal to carbon, Metal to Metal relays
8	Identification of relays, their contacts and functions
9	AC immunized DC neutral relays
10	Electronic timer
11	Flasher relay
12	Heavy duty contact relays (QBCA, Siemens point contactor relays, M/s Andrew Yule or Bhartiya Cutler & Hammer
13	Periodicity of overhauling, sealing
CABLES	
1	Different types of cables used in Signaling and Cable laying procedure
2	Cable jointing and connecting material
3	Precautions in jointing of cable
4	Periodical test on cables, fault, fault localization and rectification.
5	Termination of Signal cables
6	Soldering

SKILL

1	Soldering
2	Cable termination
3	Cable fault localization
4	Cable conductor identification.
5	Identification of relays, their contact terminals

ST/20

FOR TECHNICIAN (SIGNAL)

Description : Track Circuit	
CONTENTS	
1	DC single rail/double rail track circuit
2	Track circuit- parameters
3	Various components of track circuits
4	Fail safe and failure free adjustment
5	Length of track circuit in wooden and PSC sleepers, insulation fittings for PSC sleepers
6	Sleepers, testing of PSC sleepers
7	Measurement of rail resistance, ballast resistance, train shunt resistance
8	Checking of glued joints
9	Bonding diagram, (series and parallel) cut section track circuit impedance, bonding
10	Maintenance of block joints
11	Track drilling, bonding and connecting feed and relay end
12	Audio frequency track circuit
13	Common types of failures- trouble shooting
14	AC track circuits- parameters, adjustment, trouble shooting, Identification of relays, their contacts and functions

SKILL

1	Fail safe and failure free adjustment of track circuits
2	Testing of insulation resistance by Nylon Block Joint, Glued Joint and the resistance of PSC sleepers
3	Bonding of the rails with Mechanical and Electrical drilling Machine
4	Track circuit- trouble shooting
5	Replacement of Nylon insulations

ST/21

FOR TECHNICIAN (SIGNAL)

Description : Color Light Signals	
CONTENTS	
1	Advantage of color light signaling over semaphore.
2	Parts of 2 aspect/ 3 aspect/ 4 aspect of CLS
3	Aspect control and repeating circuits in RE/Non RE area
4	Cutting in arrangement
5	Focusing of color light signals
6	Cleaning of lenses
7	Second distant aspect controlling circuits
8	Fault tracing methods in circuits
9	LED signals- introduction & advantages
10	Operating parameters of LED signals
11	Blanking & Non-Blanking modes

SKILLS

1	Focusing of color light signal
2	Wiring of color light signals
3	Trouble shooting of LED signal circuits
4	Blanking & Non-Blanking mode selection

ST/22

FOR TECHNICIAN (SIGNAL)

Description : Point Machine	
CONTENTS	
1	Combined type point machines IRS, Siemens', 220 mm Thick web switch and high thrust point machine
2	Hand generator type point machine
3	Different type of ground connections, mounting sleeper spacing etc
4	Parts of each point machine- Internal diagrams
5	Use of cut out, snubbing circuits
	Diode method
	Directional contact method
	Snubbing contact method
6	Point control circuits
	Using Siemens point group
	Using QBCA, relays
	Using power relays
7	Precautions while working on point machine, clamping- when & how
8	Adjustment of points, maintenance skills

SKILL

1	Wiring of Point machine
2	Measurement of voltage and current of point machine
3	Adjustment of friction clutch
4	Adjustment of point lock detection slides

ST/23(a)

FOR TECHNICIAN (SIGNAL)

Description : Panel Interlocking Conventional Type	
CONTENTS	
	CONVENTIONAL TYPE (Metal to carbon)
1	Knowledge, concept of panel interlocking.
2	Types of buttons, knobs, indications
3	Various controls
4	Basic principle of interlocking
5	Basic control circuits
6	Knob control, siding control, crank handle control, LC gate control
7	Indication and route release signal control circuits
8	Typical failures and trouble shooting
9	Centralized operation with SM's control
10	Route cancellation

SKILL

1	Trouble shooting- localization of faults of the panel and the internal wiring.
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ST/23 (b)

FOR TECHNICIAN (SIGNAL)

Description : Panel Interlocking SIEMENS Type	
CONTENTS	
1	Knowledge, concept of panel interlocking.
2	Types of buttons, knobs, indications
3	Basic control circuits
4	Button control, siding control, crank handle control, LC gate control
5	Point control circuits with individual & Auto operation
6	Route release, Sectional route release and signal control circuits
7	Different groups (Relay) used in panel
8	Typical failures and trouble shooting
9	LSS control circuit
10	Sub route, Full route and emergency cancellation

SKILL

1	Trouble shooting- localization of faults of the panel and the internal wiring.
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ST/24

FOR TECHNICIAN (SIGNAL)

Description : Axle Counter (Analog & Digital)	
CONTENTS	
1	Different type of Axle counters (UAC, SSDAC, MSDAC, HASSDAC)
2	Principle of working, components of the system
3	Power supply for axle counters, precautions for resetting
4	Working circuit of different axle counter
5	Adjustment of axle counters
6	Typical failures and troubleshooting- Isolation of defective cards and their replacements
Block Proving By Axle Counters	
1	Necessity of block proving by Axle Counters
2	Details of equipment
3	Operation of the system
4	Block diagram
5	Circuit description
6	Status of relays during working
7	Installation
8	Earthing
9	Commissioning
10	Do's & Don'ts
11	Trouble shooting

SKILL

1	Adjustment of axle counters and measuring various parameters of axle counters.
2	Trouble shooting
3	Various measurements on the MUX

ST/25(a)

FOR TECHNICIAN (SIGNAL)

Description : Single Line Token Block Instruments	
CONTENTS	
1	Constructional feature, types – requirements of S/L token block instruments
2	Various parts of instruments and their use
3	Ball & tablet type- Polarity
4	Circuitry explanation: Non-RE to RE area modifications
5	DO's, Don'ts
6	Class of tokens, tablets, token/tablet pouches, hoops
7	First stop signal proving arrangements
8	Metallic/earth return
9	Testing the instruments
10	Force drop features of locks
11	Token balancing
12	Measuring- Block earth resistance
13	Measuring of outgoing/Incoming voltage/currents

SKILL

1	Wiring of Token Block instruments
2	Testing of Token Block instruments
3	Measurement of line current and voltage
4	Token balancing
5	Trouble shooting

ST/25 (b)

FOR TECHNICIAN (SIGNAL)

Description : Single Line Token Less Block Instruments	
CONTENTS	
1	Requirement of token less block working
2	Push button token less instrument (PTJ Make), DAIDO block instruments for RE area
3	Constructional features and type
4	Parts of instruments, uses of each part
5	Types of relays used and function of each relay
6	Circuitry explanation of internal and external circuits
7	Comparisons, Advantages over token instrument
8	Power supply arrangements
9	Do's and Don'ts from operation and maintenance angle
10	Testing of instruments
11	Trouble shooting
12	Record regarding cancellation

SKILL

1	Trouble shooting
2	Measurement of line current and voltage
3	Wiring of Token less Block instrument

ST/25 (c)

FOR TECHNICIAN (SIGNAL)

Description : Double Line Block Instrument	
CONTENTS	
1	Requirement of double line block instrument
2	Types of instruments used in double line
3	Constructional features, TOL lock, half notch, contacts, indicators, PR relay
4	Circuitry explanation for the instrument in RE and Non-RE area
5	Power supply arrangements
6	Provision of double locking arrangement
7	Overhauling periodicity
8	Testing of TOL lock, contact & instrument
9	Wiring and installation of instrument including PR relay
10	DO's & DON'TS
11	Trouble shooting

SKILL

1	Wiring trouble shooting
2	Measurement of voltage and current

ST/25 (d)

FOR TECHNICIAN (SIGNAL)

Description : UNIVERSAL FAIL SAFE BLOCK INTERFACE	
CONTENTS	
1	Requirement of Universal Fail Safe block interface
2	Constructional features
3	Circuitry explanation for the interface in RE and Non-RE area
4	Power supply arrangements
5	Overhauling Periodicity
6	Wiring and installation of block interface
7	DO's & DON'TS
8	Trouble shooting

SKILL

1	Wiring trouble shooting
2	Measurement of voltage and current

ST/26

FOR TECHNICIAN (SIGNAL)

Description : Signaling In 25 KV Traction Area	
CONTENTS	
1	Effects of 25 KV electromagnetic induction and static induction, parallelism
2	Screened, unshielded cables, earthing
3	Control and repeating circuits in RE area for CLS, lamp proving circuits
4	Track circuit in RE area, DC single rail, Jeumont 83 1/3Hz, Audio frequency track circuit, impedance bonds
5	AC immunity on point machines control circuits
6	Block bell and filter unit in RE area
7	ARLR, EKT, Slot circuits in RE
8	Insulations in lead out, double wire and in point rodding
9	Traction bonding staggering and cross bonding
10	DC power supplies in RE area
11	Power supply through AT
12	Use of insulated tools
13	Safety precautions to staff in RE area
14	Implantation of OHE masts and signal clearance

ST/27

FOR TECHNICIAN (SIGNAL)

Description : Automatic Signaling In Single & Double Line, Twin Single Line Working & IBS	
CONTENTS	
1	Control circuits of CLS through track circuits / axle counters
2	Cutting in arrangements
3	Automatic and Semi Automatic Signals
4	King knob control
5	Cut section track circuits in Auto signaling
6	Red Lamp protection
7	LED used in Auto signals
8	'A' marker & 'G' marker & Illuminated 'A' & 'AG' marker
9	L.C gate control in Auto territory, approach warning
10	Use of Axle counters in Auto signals
11	GR & SR applicable to Auto Signaling in Double and Single line
12	Circuits for setting up directions to approach in single line
13	Twin single line working- procedure
Intermediate Block Signaling (IBS)	
1	Role of IBS in increasing line capacity
2	Block working rules for IBS
3	Use of UAC/ SSDAC / MSDAC for IBS
4	Signaling circuits and equipments connected with IBS
5	Resetting arrangements in IBS
6	Telephone circuit for IBS
7	Types of failures occurring in IBS
8	Fault localization and restoration

SKILL

1	Trouble shooting for automatic signaling
2	Trouble shooting for IB signaling

ST/28

FOR TECHNICIAN (SIGNAL)

Description : Signal Interlocking	
CONTENTS	
1	Preparation of Signaling plan
	(a) Geographical method of numbering
	(b) Group cum Geographical method of numbering
2	Essential of interlocking
3	Interlocking relationship between various functions
	(a) Signal and point
	(b) Track Locking
	(c) Back / Route locking
	(d) Approach / Dead approach locking
	(e) Level crossing gates
4	Table of control for 4 road station
5	Wire to wire testing
6	Selection Table testing
7	Cross sheet testing
8	Functional testing

SKILL

1	Testing of locking
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ST/29

FOR TECHNICIAN (SIGNAL)

Description : Route Relay Interlocking	
CONTENTS	
1	Introduction
2	Essential of RRI
3	Description of panel, switches/Knob buttons, Color code, Lay out indications, Cancellation counter, Technician (Signal)'s Key etc.
4	Route setting and LR circuits
5	Point lock relay and control circuits
6	Point operation circuit, Point indication circuit
7	Route Checking circuit
8	Track stick relay circuit
9	Signal aspect control relay circuit
10	Signal control relay circuit
11	Approach & Route locking circuit
12	Sequential and sectional route release circuit
13	Time release circuits
14	Voltage detecting circuits
15	Panel indication circuits
16	Point crank handle interlocking circuits
17	L.C gate control circuits
18	SPZ, Goods Plunger circuits
19	Power supply arrangements
20	Cable termination, Fuses links
21	Indoor and outdoor maintenance
22	Trouble shooting

SKILL

1	Trouble Shooting
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ST/30

FOR TECHNICIAN (SIGNAL)

Description : Electro Mechanical Signaling	
CONTENTS	
1	Selection circuits
	(i) Signal aspect control circuits
	(ii) Route holding, approach locking, back locking, sectional route release
	(iii) Indication locking on signal and point levers, track locking on point lever
2	Power Operated lifting Barrier gates
3	Mechanical Lifting Barrier Gates
4	Auto warning of LC gates

SKILL

1	Trouble Shooting
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ST/31

FOR TECHNICIAN (SIGNAL)

Description : Electronic Interlocking and Data Logger	
CONTENTS	
1	Need for Electronic Interlocking
2	Comparison between EI(Electronic Interlocking) and Route relay interlocking/Panel interlocking
3	Block diagram of EI and principle of working
4	Function of CPU- inputs and outputs
5	Circuit conversion to Machine language
6	Programming of E prompts, testing and installation/entry of interlocking into EI
7	Function of microprocessor-Fail safe principles
8	Normal operation, diagnostic error codes
9	Different voltages for equipments
10	Grounding of equipments, Lightning & Surge protection arrangements
11	How to restore the failures and trace of failures
12	Application Program Design , Installation of application software, introduction to FAT & SAT testing
13	Pre-commissioning check lists
	Data Logger
1	Principle of working and equipment description and application
2	Power supply to Data logger
3	Networking of Data loggers and validation of inputs
4	Diagnostic features that can be incorporated in the Data loggers
5	Generation of Fault logics, Generation of Exceptional Reports , Offline/ Online Simulation

SKILL

1	Various measurements on SSI and Data logger
2	Data logger- Retrieving data & Taking printouts & Validation

ST/32

FOR TECHNICIAN (SIGNAL)

Description : Auxiliary Warning System(AWS)	
Train Protection Warning System(TPWS)	
Train Collision Avoidance System(TCAS)	
CONTENTS	
	Auxiliary Warning System(AWS)
1	System functioning
2	Various components
3	Block diagram of AWS
4	Failures, localization and rectification
	Train Protection Warning System(TPWS)
1	System functioning
2	Various components
3	Block diagram of TPWS
4	Failures, localization and rectification
	Train Collision Avoidance System(TCAS)
1	System functioning
2	Various components
3	Block diagram of TCAS
4	Failures, localization and rectification

SKILL

1	Various measurements on AWS, TPWS & TCAS
2	Failures, localization and rectification on AWS, TPWS & TCAS

ST/45

FOR TECHNICIAN (TELE)

Description : Passenger Amenities (PA, PIS, IPIS & GPS Clocks)	
CONTENTS	
1	Principles of audio system.
2	Micro phones, general and special types
3	Loud speakers of all types.
4	Impedance matching and voltage matching
5	Amplifiers for PA system and trouble shooting
6	Paging and talk back system.
7	Arrangement of PA system indoor, outdoor - precaution to be followed.
8	P.C. based train announcement system (ARR/DEP)
9	IP based PA System
10	PIS , GPS Clocks & Tape recorders.
11	P.C. based train display system (ARR/DEP) & IPIS.
12	Remote paging.

SKILL

1	Setting up of PA system.
2	Trouble shooting - PA system, paging and talk back, tape recorder, train display system, PC cum IP based PA system.

ST/46

FOR TECHNICIAN (TELE)

Description: Electronic Exchange And IP Exchange	
CONTENTS	
1	Basic knowledge of Telephone Exchange
2	VoIP Fundamentals & VoIP Protocols
3	Principles of working of SPC - Exchanges
4	Various modules of the exchange.
5	Various types of exchanges and their functioning
6	NGN
7	NGN Protocol
8	MDF/IDF Protective devices
9	Earthing - its importance - maintenance of earth resistance
10	Common fault in Electronic telephone, exchanges and their rectification
11	Telephone operator console for various Electronic exchanges and their working with Electronic exchange

SKILL

1	Trouble shooting - Identification and removal of faulty card
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ST/47

FOR TECHNICIAN (TELE)

Description: Tetra, GSM-R and LTE	
CONTENTS	
1	Scenario of Mobile Train Radio Communication & LTE on Indian Railways
2	VHF Mobile Radio Communication & Tetra
3	Cellular Mobile Radio Communication System
4	GSM
5	GSM-R/LTE
6	GSM-R BSS equipment (Nokia -Siemens networks)
7	Maintenance schedule of MTRC system
8	4 G- Data Services
9	Wireless Local Loop (WLL) Systems
10	Annexure-1 (WPC)

SKILL

1	Trouble shooting - Identification and removal of faulty card
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ST/48

FOR TECHNICIAN (TELE)

Description: Railnet, Wi-Fi System, PRS, UTS & FOIS	
CONTENTS	
1	Introduction of Railnet over Indian Railways & basic components in Railnet
2	Basic concept of Railnet with block Diagram in Indian Railways
3	Introduction of Wi-Fi System over Indian Railways & basic components in Wi-Fi System
4	Implementation of Wi-Fi System in Trains & on Stations with block diagram
5	Study of basic component used in Railnet & Wi-Fi System over Indian Railways
6	Authentication of Wi-Fi security features
7	PRS : Advantages of computers, Role of S & T department, Reservations, Requirements of data circuits and standard levels, System block diagrams.
8	UTS : Advantages of computers, Role of S & T department, Requirements of data circuits and standard levels, System block diagrams.
9	FOIS : Advantages & Role of S & T department, Applications, Requirements of data circuits and standard levels, System block diagrams.

SKILL:

1	Knowledge about Railnet and Troubleshooting of its components
2	Knowledge about Wi-Fi and Troubleshooting of its components

ST/49

FOR TECHNICIAN (TELE)

Description : Train Traffic Control (RE/Non- RE) & VoIP based Control Communication	
CONTENTS	
1	Knowledge of control working in Non-RE/RE area.
2	Head quarters equipment in Non-RE and RE area (DTMF type)
3	Way station equipment in Non-RE/RE area (DTMF type)
4	Study of control telephone, portable telephone, emergency control circuit.
5	Various types of measurements and tests on control circuit with quad cable / OFC
6	Study of Radio patching.
7	Control working from non RE to RE using 4- wire/2 -wire conversion equipment.
8	Maintenance and fault finding of HQ, Way station, Equalizer amplifier repeater, VF Repeater, Cable hut and control medium.
9	Brief description of line plant (Quad / OFC cable)
10	Extending auto phone to accident side over emergency control.
11	Study of cable hut, VF repeater, Equalizer amplifier repeater in RE and non-RE section controls.
12	VoIP based Control Communication

SKILL

1	Radio patching.
2	Testing of Cables from control office.
3	Trouble shooting of
	a) DTMF-HQ Equipment.
	b) DTMF-Way station equipment.
	c) Control Telephone
	d) 4 Wire/ 2 Wire conversion equipment

ST/50

FOR TECHNICIAN (TELE)

Description: Optic Fiber Communication, PDH/SDH Equipments	
CONTENTS	
1	Basic principles of optical fiber communication its applications and advantages.
2	Construction of optical fiber cable.
3	Important characteristics of the cable.
4	Fiber termination and underground joint closure.
5	Splicing practices.
6	Testing, localization of fault and its rectification - usage of OTDR.
7	Precaution during cable laying.
8	Functions of OLTE, optical source, line coding unit drop/insert MUX, supervisory and alarm circuits etc.
9	Various measurements during normal maintenance.
10	Block Interface.
11	PDH / SDH Equipment

SKILL

1	Able to assist in various measurements on Optical Fiber cable based communication
2	Troubleshooting of various cards in PDH/ SDH Equipments

ST/51

FOR TECHNICIAN (TELE)

Description: Amplifiers, Oscillators, Modulation & Demodulation	
CONTENTS	
1	Amplifiers, class A,B & C
2	Push pull and complimentary symmetry amplifiers.
3	Feed back - positive and negative.
4	Oscillators - Colpitts, Hartley, crystal & phase shift.
5	Operational amplifiers.
6	Principles of modulation & demodulation - AM & FM
7	Pulse Code Modulation.

SKILL

1	Able to assist in the measurement on PCM
2	Able to test all the circuits covered in the course

ST/52

FOR TECHNICIAN (TELE)

Description: Digital Fundamentals & Application	
CONTENTS	
1	Numbers, codes & conversions.
2	Boolean Algebra, Gates & Flip flops.
3	Arithmetic Circuits.
4	Registers and counters.
5	Encoders, decoders, multiplexers & de-multiplexers.
6	Memory circuits (RAM & ROM)
7	Principles of digital clock.
8	Principles of digital switching.
9	Introduction to Microprocessor & Personal Computer.

SKILL

1	Able to fabricate digital clock on 'Bread Board'
2	Able to test all the circuits covered in the course

ST/53

FOR TECHNICIAN (TELE)

Description: Emergency Communication	
CONTENTS	
1	Use of Portable control telephone & megaphone.
2	Mobile and portable VHF sets.
3	Use of P.A. Systems.
4	Use of magneto phones, selective calling telephones and field service cables.
5	Items used in breakdown (Communication).
6	Latest Satellite Phone
7	Remote subscriber unit (Extending auto telephone to accident site).
8	Visit to break down special.

SKILL

1	Able to use all the equipment covered in the course
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ST/54

FOR TECHNICIAN (TELE)

Description: Basics of Satellite Technologies, VSAT & Disaster Management Communication	
CONTENTS	
1	Basics of Satellite Communication, VSATs
2	Role of Satellite Communication in Indian Railways for Disaster Management Communication with block Diagrams
3	Advantages & Disadvantages
4	VSAT : Advantages & Role of S & T department, Application, Requirements of data circuits and standard levels, System block diagrams.

SKILL

1	Able to use all the equipment covered in the course.
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ST/55

FOR TECHNICIAN (TELE)

Description: IP based Video Surveillance System & ISS	
CONTENTS	
1	Applications of CCTV
2	Types of Camera
3	Networking of CCTV & Study of block diagram of CCTV
4	Integrated Security Systems
5	Differences between monitor and TV receivers.

SKILL

1	Able to use & understand the component covered in course
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ST/56

FOR TECHNICIAN (TELE)

Description: VHF Systems	
CONTENTS	
1	Wave propagation.
2	Frequency ranges.
3	Oscillators, Amplifiers, Modulators Demodulators.
4	Simplex and duplex system of communication.
5	Block diagram of Radio transmitter and receiver.
6	Types of Antennae and their installation.
7	Types of power suppliers used for VHF sets.
8	Various applications of VHF Trans receivers.
9	Precautions while using the sets.
10	Trouble shooting.

SKILL

1	Able to use HF & VHF sets.
2	Trouble shooting.

ST/57

FOR TECHNICIAN (TELE)

Description: Advance IP Network, NMS & Security of Network	
CONTENTS	
1	Basic concept of Networking
2	Networking Basics
3	Routing Basics
4	Routing & Switching
5	Networking, Firewalls
6	DO's and DON'T's.

SKILL

1	Able to use all data equipments covered in the course
2	Trouble shooting all data equipments covered in the course

ST/65

FOR JE (Signal) & JE (Telecom)

Description: Establishment, Stores, Signal Engineering Manual, Telecom Manual, G&SR	
CONTENTS	
1	Establishment, stores.
	a) Imprest stores - Consumable stores, dead stock.
	b) Tools & plants
	c) Maintenance of registers.
	d) Preparation of requisitions, custody and maintenance of stores - return of stores
	e) Loss & theft of store
	f) Stock verification
	g) Recruitment casual Labour, discharged of casual Labour.
	h) WCA, PW Act, HOER, Factory Act.
	i) Official Language Policy and rules.
	j) Discipline and Appeal Rules.
	k) Leave and Pass Rules.
2	Duties of Technicians and Supervisors as mentioned in SEM and Telecom Manual.
3	Trolley and lorry working and protection.

Course Director (CD) ASSESSMENT

ANNEXURE-3

To encourage good behaviour of students both in class Rooms & Hostels and to reward them for actively participating in Swatcha Bharat /Shramdhan Programs, approximately 10% marks have been allocated as Course Director's Assessment, which will be made based upon the following criteria:

A. Trainees conduct in Hostels and Class Rooms

1. Communication skills
2. Punctuality
3. Attentiveness
4. Discipline/ Behaviour in Class/Hostels and Mess
5. Dress code/Room Maintenance in Hostels
6. Participation in Mess activities/Service at Mess

B. Trainees Participation in Extra Curricular activities

1. PT/Yoga
2. Swatchha Bharat/Cleanliness programs/Garden activities
3. Tree plantation / watering
4. Cultural/Sports activities
5. Service in Library /Auditorium etc

Note :- 50% to be given to an average student.

Marks sheet to be countersigned by a JAG/SAG officers for courses at IRISSET and by a Sr.Scale officer for Zonal Training Centre.