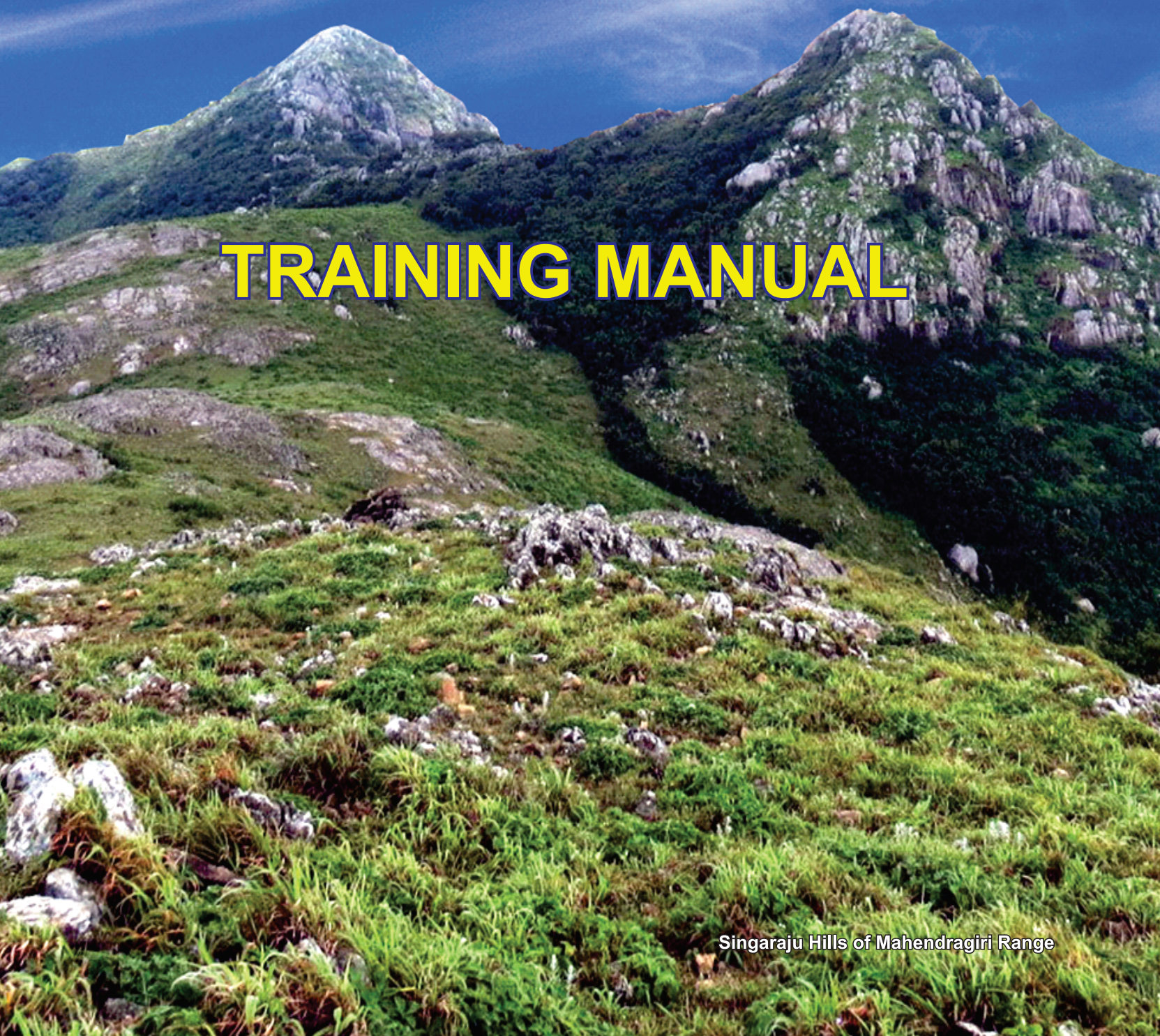
FOREST AND ENVIRONMENT DEPARTMENT
GOVT. OF ODISHA

TRAINING MANUAL



Singaraju Hills of Mahendragiri Range

TRAINING MANUAL

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PREFACE

Odisha, with more than one third of its geographical area under green cover, has a wide ranging ecosystems such as marine, coastal wetlands and terrestrial ecosystem occurring upto 1600 meter altitude. Such diverse ecosystems support rich floral and faunal diversity with many endemic species. The network of Protected Areas established in the State has fortified preservation of rich landscapes and critical habitats.

The rich biodiversity of the State is interspersed by a predominantly rural (about 83%) population. The developmental aspirations of the State is exerting a considerable pressure on natural resources. The conflicting demands of conservation and development pose a serious challenge in the management of such resources. This necessitates the Forest Work force to be technically equipped, professionally empowered with attitudinal orientation towards achievement of objectives. The Forest Department endeavours to achieve this through training of forest officers at various levels. Such training are governed by rules and regulations that have been notified by State and Union Governments and guidelines issued by PCCF, Odisha.

In order to make the training dynamic and qualitatively of the highest standard, a **"TRAINING BOARD OF FOREST DEPARTMENT "** has been constituted to guide the training as per the emerging needs and to ensure the conduct of these trainings in a scientific and systematic manner. Although rules and regulations governing training provide for "What to Do", "How to Do" remains a grey area in many aspects and leaves a scope for individual discretion. In order to bridge the gap, this **"TRAINING MANUAL"** has been conceptualized, which is expected to strengthen the existing system. Another highlight of this Training Manual is the "**Refresher Trainings**" for all levels. This was a long felt need especially for the field staff at cutting edge level who do not get adequate exposure in the fast changing scenario to upgrade skills after their initial training. Another important section of the department is ministerial staff who play an important role but are not adequately trained. An effort has been made to overcome such shortcomings of the system through this manual.

While appreciating the valuable contributions of members of the Training Board in providing their inputs, it is made amply clear that this Training Manual is in addition to existing rules and regulations and in no way replace or modify them. In case of any contradictions, the rules and regulations shall prevail.

I hope this step shall mark the beginning of a worthy journey to achieve the desired ends of providing ecological security to the citizens of our state, through adequately empowered human resource of the department.

S. C. Mishra

Bhubaneswar
17th March, 2018

(**S. C. MISHRA,** IFS)
PCCF and HoFF, ODISHA

ACKNOWLEDGEMENT

Capacity building of officers and staff of the Forest Department is of paramount importance for efficient functioning of the Department. To undertake the capacity building programmes systematically with a need based dynamic system, this "Training Manual" has been brought out by the PCCF, Odisha.

First and foremost, thanks are due to Sri Subash Chandra Mishra, IFS, our visionary Principal Chief Conservator of Forests and HoFF for conceptualizing such an innovative document for the Department. With his keen interest and valuable guidance and interventions at each stage, this manual could see the light of the day. I express my sincere and heartfelt gratitude to him.

Newly constituted Training Board **(Annexure-I)** has contributed a lot in shaping the Training Manual. The brain storming sessions and detailed and critical analysis of each aspect, led to finalization of contents of this manual. The undersigned express gratefulness to all the members of the Training Board.

Efforts of Sri Pravakar Behera, IFS, CCF (T & D), Cuttack, Dr. Sudarsan Panda, IFS, RCCF, Angul Circle, Sri Shashi Paul, IFS, RCCF, Berhampur Circle, Smt. P. Mekro, IFS, RCCF, Bhubaneswar Circle and Sri Lingraj Otta, IFS, RCCF, Rourkela Circle are praiseworthy in drafting various chapters of this manual.

Last but not the least, there are many more people who have contributed directly or indirectly in this exercise. The undersigned thank all of them for their contributions. Since this is first such exercise and there may be some omissions or shortcomings, suggestions for its improvement are always welcome.

BHUBANESWAR
March, 2018

(**Rajiv Kumar**)
Chief Conservator of Forests (P & A)

CONTENTS

CHAPTER-1

TRAINING MANUAL FOR INDIAN FOREST SERVICE (IFS)

The Indian Forest Service (IFS), one of the three All India Services, was constituted in the year 1966 under the All India services Act, 1951 by the Government of India. The training of new recruits to this service is governed by IFS probation Rules and IFS (Probation and Final Examination) Rules. These rules are amended from time to time. Presently the rules amended in 2016 vide Notification GSR No. 270 (E) dated 02.03.2016 of Ministry of Personnel, Public Grievances and pensions are in force. These rules as amended from time to time shall govern the training in the State. Changes, if required, due to the amendment of rules or any other reason, at any time, shall be suggested by the Training Board of the State to the PCCF Odisha who in turn (with or without changes) will submit the same to the Government of Odisha for approval.

1. Probation Period

The two-year probation period is divided into three parts:

i. Foundation Course – 4 Months
ii. Professional Course at IGNFA – 16 Months
iii. On the Job Training (OJT) – 4 Months

While the (i) and (ii) above are the responsibility of Government of India, the (iii) above is the responsibility of the respective state government to which the probationer is allocated.

2. On the Job Training (OJT): On completion of professional course in Indira Gandhi National Forest Academy, Dehradun a probationer joins his or her cadre state for OJT. As per details given by MOEF vide D.O. No. 15011/10/2010-IFS-II dated 18.03.2016 **(ANNEXURE-II)**, the following schedule is suggested:

Division Attachment:	1 week
Circle Attachment:	1 week
District Attachment:	1 week
Range Attachment:	12 weeks
Forest Head Quarter Attachment:	1 Week

In addition to the schedule suggested by Government of India, one-week training in Gopabandhu Academy of Administration, Bhubaneswar shall be the part of OJT. The following shall be the modalities of the OJT:

3.1. During the month of January of the year in which an IFS probationer is due to join the State, the CCF (T & D), Cuttack shall ascertain the number of probationers to join the cadre from Director, IGNFA and shall convene the meeting of Training Board.

3.2. The Training Board shall discuss and decide the division, circle and range for training of the probationers as per guidelines of Government of India. For this purpose, the variety of works

in the division and range and aptitude of the concerned trainer DFO shall be considered. After finalization of the details by the board, the recommendation will be placed before the Pr.C.C.F by CCF (P & A) for his approval. As per approval (with or without modification) of the Pr.C.C.F, Odisha, the proposal will be submitted to Government of Odisha in F & E Department by end of February of the year in which the probationers are due to join the state.

3.3. On receipt of Government orders the same shall be communicated to the concerned probationers through Director, IGNFA by CCF (P & A), O/O the Pr.C.C.F, Odisha along with reporting details and contact officer.

3.4. The following shall be the schedule of OJT for IFS probationers:

Week	Attachment	Training Details	Hq. for salary purpose
1	**Gopabandhu Academy** of Administration, Bhubaneswar	1. History of Odisha 2. Land management related laws in the State 3. System of maintenance of land records 4. History of Forestry in Odisha 5. Overview of Forest laws in the state 6. Overview of Forest Administration in the state. 7. Tribes of Odisha and their welfare	City Division, Bhubaneswar.
2	a. **Forest Hq.** O/O the Pr.C.C.F., Odisha (2 days)	To understand the functioning of different wings of forest Hq.	City Division, Bhubaneswar.
	b. O/O the **Pr.C.C.F. (WL)** (1 day)	To get acquainted with WL wing	
	c. O/O the **Pr.C.C.F. (KL)** (1 day)	To get acquainted with KL wing	
	d. O/O the **Pr.C.C.F. Projects** (1 day)	To get acquainted with special projects	
	e. O/O the **M.D., OFDC** (1 day)	To know the working of OFDC	
3	Attachment to RCCF Office	Exposure to working of RCCF office, areas of special significance like man-animal conflict, protection, important wildlife habitat etc. in the circle	Respective DFO Office

4	**Attachment in DFO office**	1. Exposure to Administrative setup, Management of Forests and W.P. of the Division. 2. Exposure to working of different sections of the DFO office 3. Forest working (Timber coupe, Bamboo coupes and SSO), Permits 4. Exposure to protection related activities like patrolling, prosecution reports, Confiscation proceedings etc. 5. Exposure to CAMPA and other schemes	Respective DFO Office
5	**Attachment in District Offices** a) **Collectorate** – 2 days (one day in collectorate and one day in skill development and watershed/soil conservation office) b) **S.P. Office** – 1 day c) **Judicial Offices** – 1 day d)**Settlement Training** – 2days	To understand the working of respective offices and settlement process	Respective DFO Office
6-17	**Range Attachment**	The IFS (P) shall remain in-charge of the range and shall look after all the affairs of the range	Respective DFO Office

4. Monitoring and Evaluation:

4.1. During the training the performance of the probationer and conduct of training by trainer DFO shall be closely monitored.

4.2. For the purpose of monitoring the Pr.C.C.F, Odisha shall nominate CCF (T & D) or any other officer of rank of CCF and above as **Mentor.**

4.3. Every probationer shall submit a weekly report describing the activities seen and learnings to the mentor. For the period of the Division attachment and Range attachment these weekly reports shall be submitted by the probationer through the trainer DFO. The trainer DFO shall forward it with his/ her comments about satisfactory nature or otherwise of the training. A copy of such report shall also be marked to the concerned RCCF by the DFO.

4.4. At the end of 17 weeks the mentor shall place his report alongwith weekly reports before the Pr.C.C.F, Odisha for his perusal. If Pr.C.C.F. Odisha feels that there is some part of the training which has not been completed satisfactorily then he may order for repeating the same. In case such repetition results from factors like negligence or carelessness etc. on the part of the probationer then Pr.C.C.F Odisha may recommend to the Government for extension of probation period.

5. **Third Year** i.e. year after the two-year probation shall be utilized as below:

i) In the first three months the officer shall continue in the range as in charge of range in continuation to 12 weeks of OJT.

ii) For next six months the officer shall be posted as attached officer to a forest division.

iii) In the last three months of the year the officer shall be attached to circle office.

CHAPTER-2

TRAINING MANUAL FOR STATE FOREST SERVICE (ACF)

A. INDUCTION COURSE

After selection to State Forest Service the new recruits undergo training at one of the three Central Academy for State Forest Services (CASFOS) located at Dehradun, Coimbatore and Burnihat. While each academy is headed by a Principal but overall responsibility remains with Director of Forest Education under Ministry of Environment Forest and Climate Change. Training of SFS trainees is governed by The Entrance and Training Rules for the State Forest Service Officers. Presently the Entrance and Training Rules (Revised), 2004 for the State Forest Service Officers published vide GSR No. 465(E) dated 22.7.2004 are in force. These rules as amended from time to time shall govern the training in the state and changes if required due to amendment of rules at any point of time or any other reason shall be suggested by the Training Board of the state to the PCCF Odisha who in turn (with or without changes) will submit the same to Government for approval.

1. **DURATION OF THE TRAINING-** Duration of the training is two years. These two years are divided as below:
   i) First Phase - 16 Months
   ii) Field Training - 4 Months
   iii) Second Phase - 4 Months

While i and iii above are conducted at respective CASFOS the (ii) above is conducted in the respective state.

This two-year training is followed by Two Year probation period in the state.

2. **FIELD TRAINING**: 2.1 As per rule 16 (b) of the rules mentioned above, the field training shall be as below:

Sl. No.	Attached to	Issues to be covered	Duration in weeks	Hq. for Salary
1	Range Forest Officer	i. Land Records ii. Silviculture Systems iii. Tree Improvements iv. Grafting v. High Technology Nursery vi. Clonal Propagation vii. Voucher Preparation viii. Cash Handling ix. Accounts x. Range Management xi. Enquiry of Forest Offences xii. Demonstration and Marking	Five	Concerned DFO

2	Divisional Forest Officer	i. Establishment Matters ii. Office Management iii. Budget iv. Audit v. Legal Matters vi. Co-ordination with District Administration vii. Protection and Management of Forest viii. Afforestation Programs ix. Eco-tourism x. People's Participation, PRA, RRA, Agro Forestry, VFC	Five	Concerned DFO
3	Forest Corporation	i. Harvesting ii. Logging iii. Transport iv. Depot Management v. Volume and Royalty Calculation vi. Marketing	Two	Concerned DFO
4	Revenue Authorities	i. Land Records ii. Rural Development Programmes	One	Concerned DFO
5	Law Enforcement Authorities in the District and Tehsil Level	i. Enforcement of Laws and Policies ii. Integrated Efforts iii. Cooperation iv. Interaction	One	Concerned DFO
6	Public Prosecutor, Government Counsels	i. Application of Law ii. Filing of Cases iii. Follow up Action.	Two	Concerned DFO
	TOTAL		**16 WEEKS**	

The Divisional Forest officer with whom the "OFFICER TRAINEE" is attached shall be responsible for successful completion of "FIELD TRAINING". A total of 200 marks are earmarked for "FIELD TRAINING" of which the Divisional Forest Officer shall assess the "Officer Trainee" for 100 marks. The college on the basis of monitoring and feedback shall assess for the remaining 100 marks.

2.2 **PROBATION**: On completion of two-year training there will be two year probation period as per rule 19 of The Odisha Forest Service, Group –A (Junior Branch), (Recruitment and Conditions of Service) Rules, 2013. During this period **first year shall be devoted for Range Training** wherein the probationer will be posted as in charge of a range followed by **two weeks of circle attachment** and for rest period probationer will undergo **division attachment as ACF** of the division.

For Training of SFS Trainee officers in the state following shall be the modalities:

a) Six months prior to joining of the trainee in the state for Field Training, CCF (T&D) shall ascertain the number of trainees to join the state and shall convene the meeting of the Training Board.

b) The Training Board shall discuss and decide the range and division for attachments during field training of sixteen weeks. Other attachments as prescribed for field training shall be undertaken in the jurisdiction of the same division. The Training Board shall also decide the Range for Range Training during probation and division for attachment as ACF. For all these purposes the variety of works in the division and range and aptitude of the Trainer DFO shall be considered by the Training Board. The recommendations of the board shall be placed before PCCF Odisha by the CCF (P&A) for his approval. As per approval (with or without changes) of the PCCF Odisha the proposal will be submitted to Government of Odisha in F&E Department four months prior to joining of the trainee for field training in the state.

c) On receipt of the Government orders the same shall be communicated to the concerned trainees through the Principal of respective CASFOS by the O/O PCCF Odisha along with reporting details.

3. MONITORING AND EVALUATION:

3.1. During the training the performance of the trainee and conduct of training by the trainer DFO shall be closely monitored.

3.2. For the purpose of monitoring, PCCF, Odisha shall nominate CCF (T&D) or RCCF concerned or any other officer not below the rank of Conservator of Forests, as mentor.

3.3. **During Field Training** of sixteen weeks every trainee shall submit a weekly report describing the activities seen and learnings to the concerned DFO who in turn shall forward the same to the Mentor with his comments. **Based on such weekly reports and in consultation with the Mentor the Trainer DFO shall assess the trainee for the marks assigned to Field Training of sixteen weeks.** Such assessment shall be submitted to PCCF, Odisha for his perusal and onward transmission to Government for sending it to Government of India.

3.4. **During the Range Training and Division attachment during probation** the Probationer shall submit to the Trainer DFO monthly reports about his training and Trainer DFO shall submit the same to the Mentor with his observations. Mentor shall review the same at least once in a quarter. On completion of two years of probation the mentor shall place his report along with monthly reports before the PCCF Odisha for his perusal. If PCCF, Odisha feels that there is some part of training which has not been completed satisfactorily, then he may order for repetition of the same. In case such repetition results from factors like negligence or carelessness of the probationer, then the PCCF, Odisha may recommend to the Government for extension of the probation.

B. REFRESHER COURSES FOR SFS OFFICERS (ACFs & above)

INTRODUCTION

To sharpen the skills and keep the officers updated the refresher courses shall be conducted for SFS officers at various levels.

DURATION OF THE COURSE

Generally these refresher courses shall be of one-week duration every year. This duration is indicative and the same can be increased or decreased, as the need may be. For each year the Training board will decide the duration of these courses to be conducted during the year and the same is subject to approval by the PCCF, Odisha.

MODALITIES

1) The Training Board of the state shall decide the trainings to be conducted during the year. The Board shall discuss the themes and modules on which trainings shall be conducted. For this purpose, the board shall select the modules available with the training institutes or can also consider a new theme and module. The recommendations of the board shall be subject to approval by the PCCF Odisha.

2) For each training the group size should not exceed 30 as far as possible.

3) These trainings shall be conducted in OFRC, Angul or any other institute as deemed fit. Such trainings can also be conducted at circle level depending on the logistics and other resources available. These modalities shall be decided by the PCCF, Odisha on advice of the Training Board.

4) The endeavor shall be to give at least one training to each officer in two years, as far as possible. The CCF (T&D), Cuttack shall maintain the database of the officers and trainings attended by them. Where ever possible, the officers may be given the choice to indicate their preference of the modules.

5) CCF (T&D) with inputs and consent of the Training Board shall maintain a database of resource persons for different topics. The same shall be made available to the organizers of the trainings in the beginning of the year. In case, the organizing institute or circle want some modifications then the same can be done in consultation with PCCF Odisha. Remunerations for the resource persons shall be as per rates/limits decided by the Government of Odisha/PCCF Odisha.

6) Following are the **indicative themes** to be covered in such trainings either individually or in combination as per the decision of the training board subject to approval by the PCCF Odisha.

   i) Forest Policy and Law

   ii) Community Participation and Livelihood Issues

iii) Rehabilitation of Degraded Forests and Afforestation
iv) Forest Fire
v) GIS and IT applications
vi) REDD+, Climate Change
vii) Biodiversity Conservation
viii) Man, Animal Conflict
ix) Financial Management

As per the decision of the PCCF Odisha, about the theme(s), CCF (T&D) or any other officer or institute specifically assigned, shall prepare the detailed module(s) and shall get it approved from the PCCF Odisha.

7) At the end of each training, the participant shall give written feedback individually. The organizing agency shall analyze this feedback for future modifications/improvements in the course contents etc.

CHAPTER-3

TRAINING MANUAL FOR FOREST RANGERS

A. INDUCTION COURSE

1. Institute:

The training will be conducted at Odisha Forest Rangers College,Angul

2. Duration of the Course:

The duration of the course shall be eighteen months training programme leading to award of certificate in forestry. There shall be a term break of 30 days during the course. The time of term break shall be fixed by the Director, OFRC, Angul. The entire course will be covered in two phases.

3. Syllabus:

Detail training syllabus will be maintained as per the Entrance & Training Rules (Revised) 2004 for Forest Range Officers issued by Director,Forestry Education as per **Annexure-III**.

As per the approved syllabus (**Annexure-IV**), there will be 19 no of subjects covering both theory & practical. They will be covered in 2 phases, with 9 subjects in the first phase & 10 subjects in second phase.

Examination will be held for total 3600 marks for subjects covered under syllabus. Besides, there will be marks for tour exam, field exercise, viva voce & conduct, the abstract of which is given bellow.

Sl No.	Items	1st Phase	2nd Phase	Total
1	Written Exam	1750	1850	3600
2	Tour Exam	600	400	1000
3	Field Exercise	200	200	400
4	Viva voce	-	200	200
5	Conduct Marks	-	250	250
Total		**2550**	**2900**	**5450**

At the end of the course final order of merit will be prepared based on the marks obtained in examination & assessments.

The course content as prescribed by MoEF& CC will be forwarded. As regards additional inputs, the recommendation of Training Board will be followed.

4. The Course:

The course so covered will be a residential course with hostel facility. All the trainees will be accommodated in the college hostel & will have to remain in the hostel throughout the training

period. They shall have to abide by the hostel rules & are not allowed to keep their families in the hostel.

The trainees will have a self-run mess which will work through a mess committee. The mess committee will be changed every month, so that all the trainees will get the opportunity to run the mess. Mess for ladies & gents will run separately. All trainees are required to take their meals in the mess.

Facilities for games including volleyball, badminton, football and table tennis will be provided to the trainees. It is mandatory for all the trainees to take part in the games.

There will be PT class in the morning & games class in the evening for one hour each in which every trainee should compulsorily participate. Training on Judo and Karate may also be imparted during the course.

5. Laboratory facilities:

Laboratory facilities for Survey, Utilization, Geology and Botany shall be provided. Computer facilities shall be provided to the trainees.

6. Library facilities:

Library facility with adequate no. of books relating to forestry, wildlife and other subjects shall be available. Periodical on forestry & wildlife research shall be available to update the knowledge of trainees on recent development in the field of forestry & wildlife.

7. Teaching faculty:

The teaching faculties include 3 categories

i. Permanent faculties from the Department: There will be permanent faculties in the college of which two shall be in the rank of Dy. CF, six will be in the rank of ACF and three in the rank of Range officers besides the Director of the College in the rank of Conservator of Forests. Out of 2 Dy. C.F, one will be in the charge of administration and the other will look after the necessary arrangements required for academic activities besides taking regular classes. The Dy. C.F in the charge of academic activities will be designated as the Course Director and he/she shall co-ordinate and organise the tours, field visits and academic classes as per the training schedule.

The ACFs will take regular classes and will be in charge of hostels as wardens. The ACFs will also act as mentors for various trainees.

The ROs are required to take practical classes and will also accompany the trainees during field tour and field exercise.

Besides this all the faculties will accompany the trainees during study tour, field exercises & field visits.

ii. Faculties on Contractual Reengagement basis: Faculties on contractual basis will be engaged through open advertisement. Besides taking regular class, they will accompany the trainees during field visit and exercise & any other work assigned to them by the Director, OFRC. They

shall be provided with remunerations and other allowances as per Finance Department Resolution and G.A Department Resolution to be decided by PCCF, Odisha.

iii. **Resource persons from college & Institutes:** Besides regular teaching faculties, resource person from various colleges and Institutes having expertise in the subject will be invited to give lecture on specialized subjects and remunerations to be decided and revised from time to time by the Training Board of Forest Department.

Trainees will be encouraged to organise seminars / presentations on the subject of their specialisation within the broad syllabus as prescribed by DFE. This will also aim to enhance the sphere of knowledge in the fields of forestry, wildlife and environment of local, regional and international importance and also to improve the communication skills of the Trainees. The weightage on this seminar will be a part of overall assessment of conduct during the training. (20 marks)

It is the duty of all the faculties to maintain discipline and conduct in the college campus.

8. Day to Day Training Schedule:

Every day PT and games class will be done in the morning (5 am in summer and 6 am in winter months) and evening (5.30 pm in summer and 4.30 pm in winter) respectively for a period of one hour. Football, Volley ball, Badminton, Table tennis and Cricket facilities are available in the college. It is compulsory for every student to attend the PT and games class.

Regular class (Pre-lunch session) will start at 9 am in the morning and continue till 1.15 pm with a tea break of 15 min. at 11 am. After lunch the classes will start from 2.15 pm and continue till 4.15 pm. The lunch time will be for duration of one hour, i.e from 1.15 pm to 2.15 pm. All trainees (except Mess duty officer of the said day) should attend the class compulsorily. Trainees whose attendance at the college falls below 80% shall not be permitted to appear in the exam.

9. Dress Code:

During the entire period of training at the college, all the officer trainees shall adhere to the prescribed college dress code. They should maintain a smart turn out and appear properly dressed at all times. The dress code inside campus will be Khaki uniform (Both for Ladies and gents)

a) Full pants

b) Shirts full sleeved with shoulder flaps and two chest pockets

During PT and games, the uniform will be White sports shirt and White half pants for gents and white sports shirt with white full track pant for ladies. Any other time the gents trainees will be dressed in white full pant and shirt and the ladies will be in white salwar kamiz and dupatta inside the campus. The trainees will be required to purchase the barrette cap and belt with logo of OFRC from the college. The Trainees shall wear olive green woollen jackets / pullover during the winter months.

10. Tours & Field Exercise:

There shall be 5 major tours during the entire period of training. Besides this the trainees will be taken to different parts of Odisha on tour to have an idea and knowledge of the forest and

wildlife of the State. Entire tour period is 145 days which would cover the practical aspects of the training. Field exercises on Road alignment, engineering, working plan and census technique will be covered during the course. Performance of the trainees will be assessed during the tour and field exercise by conducting tour exam and marks will be awarded. In addition, training on motor vehicle, weapons and first aid will also be imparted. Any trainee who misses more than 10% of any tour shall have to repeat the missed portion unless exempted by the Director, OFRC, Angul.

11. Other training:

Besides the regular training classes on subjects covered under the syllabus, the trainees will be provided with weapons training in collaboration with Police Department to have a hands-on exercise to handle the weapons, swimming training, First aid training and motor vehicle training. These will build up their confidence to work in the field at any odd situation.

12. Maintenance of Discipline and conduct:

Every trainee should maintain proper discipline & conduct both inside & outside the campus, which will be counted towards their conduct mark. Any type of misconduct will be taken seriously & may lead to expulsion from the course. There will be a disciplinary committee the members of which will be decided by the Director OFRC in respect of minor cases. The Director will recommend the punishment to be given to any trainee for any type of misconduct/indiscipline. For any major punishment including expulsion of the trainee from the college will be decided by the DFE.

13. Examination:

The examination shall be conducted as per the guideline issued by DFE. There shall be two examinations at the end of first and second phase. Each theory paper will be for three hours. The marks allotted to each subject are given below.

First Phase		Marks		
Sl. No	**Subject**	**Theory**	**Practical**	**Total mark**
1	Botany/Maths	100	0	100
2	Application of modern tools and Technology	150	50	200
	Remote sensing			
	Computer Application GIS			
3	Silviculture-I	150	50	200
4	Silviculture-II	200	0	200
5	Forest Resource Assessment	150	50	200
6	Forest Survey	150	100	250
7	Forest Engineering	100	100	200
8	Adverse Influence on Forest	150	50	200
9	Forest Utilization-I	150	50	200
	Total	**1300**	**450**	**1750**

Second Phase		Marks		
Sl. No	**Subject**	**Theory**	**Practical**	**Total mark**
1	Forest Policy and Law	250	0	250
2	Ecology and Environmental Science	200	0	200
3	Forest Utilization-II	150	0	150
4	Forest Resource Management	200	0	200
5	Natural Resource Management	150	50	200
6	Forest Economics	200	0	200
7	Biodiversity Conservation and management	200	50	250
8	Joint Forest Management, Rural and Tribal Development	150	0	150
9	Human Resource Development and management	150	0	150
10	Forest Accounts and office procedure	100	0	100
	Total	**1750**	**100**	**1850**

Besides term exam, tour exam will be conducted after every tour and each trainee has to submit tour journal and botanical collection. Marks will be awarded based on the performance in tour exam, journal, symposium, quiz test and botanical sample collection as detailed below.

Tour	Marks
Tour Exam	80
Tour Journal	50
Quiz test	20
Tour symposium	20
Botanical collection	30
Total marks for a tour	200
Total marks in 5 tours	1000

Assessment for the field exercise shall be made at the end of first and second phase. The allotment of marks for field exercise shall be as under

Field exercise	**Phase**	**Max. Marks**
Nursery, plantation and cultural operation	I	40
Mensuration	I	40
Marking and logging	I	20
Road alignment	I	50
Engineering	I	50
Working Plan	II	150
Ecological Census Technique	II	50
Total		**400**

Any trainee securing less than 50% marks in a subject will be considered to be failed in that subject. Trainees who have failed will have to appear in supplementary examination to be conducted at the end of first or second phase, as the case may be. Marks originally obtained in the subject will be counted towards his/her merit. If he/she again fails in any subject, the trainee will not be appointed in the post of Forest Ranger. After successful completion of the training, the trainee shall be appointed in the post of Forest Ranger.

14. Setting of question paper for the Examination:

There will be a panel of examiners in each subject who will set the question papers. Moderation of question paper shall be done by a group of experienced academician/senior official of the department. Two sets of question paper shall be prepared and printed for each paper. Question Pattern for each paper will consists of three parts. Part-A of the question paper will be of objective questions carrying one/two marks and all questions will be compulsory. Twenty percent (20%) of total mark will be allotted to this section. Part-B of the question will be of questions/short notes on various chapters which will carry 30% of total mark of the subject. Part-C which will carry 50% of total mark of the subject will be of long type questions.

15. Conducting the examination:

Besides the regular faculties of OFRC, faculties from different Institutes outside the campus will be called to act as invigilator to have a fair means of conducting the examination if needed. Mobile phones and other gadgets are not allowed inside the examination hall. Trainees found using any type of unfair means in the exam hall will be debarred of exam.

16. Evaluation:

The list of question setters, moderators and examiners will be submitted by the Director, OFRC, Angul which will be approved by the State Training Board. Two sets of question papers shall be prep0ared and printed for each paper,

17. Result Declaration:

At the end of the course the final order of merit based on the marks obtained in examination and the result will be declared by the Director, OFRC. Trainees securing more than 75% mark will be awarded with Honours Certificate provided he/she has cleared the exam in the first attempt and those securing less than 50% or more than 75% but not cleared the subjects in first attempt will be awarded with only Pass certificate. Medals shall be awarded to the trainee securing the highest mark (topper) in the examination (mark obtained in the subject during first attempt will be considered). The trainee who shall be considered the 'best all-rounder' will also be awarded with a medal. Trainee securing highest mark (in the first attempt) in Silviculture, Forest Policy & Law and Biodiversity conservation and management will be awarded with medal.

Matters which are not codified in DFE circular or in this training manual will be referred to the State Training Board of Forest Department headed by Principal Chief Conservator of Forests, Odisha. Decision of the Training Board shall be final in all respects.

B. REFRESHER COURSES FOR FOREST RANGERS

OBJECTIVE:

The short-term refresher Course for Forest Rangers shall be organised in the Odisha Forest Ranger's College, Angul for updating the basic knowledge in the recent trends in Forestry and Wildlife Management. The Course will provide basic inputs to the in-service Forest Rangers to effectively discharge their duties and to equip them with the emerging changes in the Forestry sector.

TARGET GROUP:

As stated in the beginning, the target group would be Range officers, of the State Forest Department.

COURSE DESIGN:

The short-term refresher course will be for a period of one week (six working days) out of which one day will be dedicated to field tour/excursions/exercise. Number of participants should not exceed thirty (30) in any case.

SUBJECTS TO BE COVERED:

The basic theme of the course will be "General refresher Course for (Range officer)". The subject and content of such course may be selected from various recent topics on forestry including the following suggested topics.

Sl. No.	Course outline	Topics to be covered
1	JFM	• JFM resolution • Constitution of VSS through Gram Sabha • Micro plan preparation • PRA exercise (practical) • Convergence • Conflict resolution • Accounting procedure • VSS under FDA, OFSDP, AJY and the difference in different scheme • EDC • Case study • Role of economic development in forest fringe village • Capacity building and income generation
2	Man-Animal Conflict and mitigation	• Reasons of conflict • Site specific/ Region specific/animal specific issues • Mitigation measures • Crowd management • Animal management

		• Corridor and its impact • Development issues and man-animal conflict • SOP for different activities like PM, Rescue, Dealing a rouge animal • Site specific management plan • Tranquilisation techniques • Rescue and rehabilitation
3	Acts and Rules	• Odisha Forest Act, 1972 and the Rules framed thereunder • Wildlife (protection) Act,1972with amendments • Forest (conservation) Act,1980 and forest conservation rule, 2003 • Odisha Wildlife (protection) Rules • Dealing with Sec 56 of OFA, 1972 • FRA • Right to information Act • Dealing with prosecution cases in wildlife and forest offences
4	Wildlife Crime investigation	• What is wildlife crime and Modus operandi crimes • Surveillance and information network, prevention of offences by early warning signs • Crime investigation and preparation of PR • Arresting the offender-Procedure and guideline • Identification of real and fake wildlife items in trade • SOPs on Tiger and other wild animals • CITES • TRAFFIC • WCCB-role and mandate • Internet as a tool in wildlife trade • Weapons used in crime • Maintenance of criminal profile directory/ dossiers • Laws to prevent wildlife offences • Anti-poaching strategies adopted in field: case study • Use of sniffer dogs and wildlife forensics
5	Policies and legal framework in forest and wildlife conservation	• Forest conservation and constitutional mandate • Key threats to forest and wildlife and conservation strategies (insitu and exsitu) • Wildlife conservation and present legislative action • National forest policy • Project tiger • Project elephant

		• Conservation centres in India • International norms for protection of wildlife • National Zoo Policy
6	GIS and its application	• Remote sensing and GIS • GPS-PDA • M-STriPES • DGPS Survey • E-green watch
7	Eco Development and people's participation	• Characteristic of Eco development • Ecodevelopment as an approach for sustainable development of PA • Possible activities under Ecodevelopment in the buffer zone with case study • Ecodevelopment and rural development • Local institutions and participation in park management • Conflicts in conservation, reasons and ways to solve it • Stakeholder identification and collaboration • Ecodevelopment analysis and planning process
8	Team building(workshop)	• Importance of team work • Factors for teambuilding and effectiveness • Process and intervention • Steps of teambuilding and development • Importance of teamwork • Characteristic of effective team members
9	Wetland Management	• Introduction and classification of wetlands • Wetlands of India-Inventory and assessment • Restoring fresh water ecosystem of riverine landscape • Social and economic consideration for wetland conservation • Succession in wetlands • Managing weeds in wetlands • Chillika- case study
10	Sacred grove	• Concept • Anthropological dimension • Biological value and ecological services of SG • SWOT analysis practical with a particular SG • Natural sacred sites • SG- for conservation of biodiversity • Policy and institutional aspects of SG • Social/Political/ economic dimensions of SG

11	Mangrove forest management	• Classification and distribution in India • Ecosystem function and its valuation • Risk of extinction • Restoration and management • Community based management for restoration with case study • Nursery techniques of mangrove species • Bhitarkanika NP and mangrove system
12	Integrated watershed management	• Basic concepts • Principle and practices • Objective of watershed management • Criteria of a watershed and factors affecting management • Runoff calculation • Management of watershed through community participation • Erosion control strategies adopted in a watershed • Rain water management in forest area • Designing structures including LBCD, contour trenches, staggered trenches, check dam, subsurface dykes, earthen bunds etc.
13	Control and management of forest fire	• Types and causes • Detection mechanism • Methods for prevention and control of forest fire and • Use of modern techniques including remote sensing, GIS • Fire mapping • Preparation of fire management plan for prevention and control • Community participation and role of VSS in fire management
14	Bio diversity Conservation	• Meaning, Importance and distribution • Hotspots • Measuring Biodiversity • Causes of depletion • Conservation: Issues and mitigation • IUCN Classification: Vulnerable, endangered, \critically endangered • Census Technique • Legal framework: WPA, Biodiversity Act, Odisha Forest Act

		• Community Participation • Use of Modern techniques including GIS, Remote sensing, radio collaring, satellite tracking, wildlife forensics etc • Corridor management for elephants and tigers
15	Forest (Conservation) Act, 1980	• Act, Rules and guidelines • Modalities for linear projects • Hydraulic projects • Mining projects • Other projects • Implication of FRA and other Acts and Rules relating to environment protection including pollution • Environmental Impact Assessment • Formulation of CA Scheme • Site specific wildlife conservation plan and regional wildlife management plan • CAMPA and OMBADC- functioning and fund flow

The subject of the Refresher Course shall be decided by the State Training Board/PCCF.

CLASSES:

Every day the morning session will be dedicated to yoga/pranayam at 6am in the morning for one hour to strengthen the trainees both mentally and physically. The classes on subject will start from 9am with 6 classes a day of one hour duration each. At 11 am there will be a tea break and at 1pm there will be lunch break for one and half hour. The post lunch session shall be from 2.30 PM to 4.30 PM. At 5pm there will be games class. Each participant shall be required to actively participate in the group discussion which shall be organised during the last day of the training programme.

DISCIPLENE AND CONDUCT:

Every trainee should maintain proper discipline & conduct both inside & outside the campus. Any type of misconduct will be taken seriously. There will be a disciplinary committee the members of which will be decided by the Director OFRC. The committee will decide the punishment to be given to any trainee for any type of misconduct/indiscipline. Participants are not allowed to use cell phone in the class room. No leave shall be allowed during the period of the course.

DRESS CODE:

The Forest Ranger attending the Course shall be in proper uniform as prescribed in the Orissa Forest Department Code.

RESOURSE PERSONS:

The resource persons will be drawn from the desired field experts. Various linked departmental officers. NGOs, Social workers, experts: educationalists would be involved in imparting necessary

inputs. Remuneration to the resource persons will be provided and revised from time to time as would be fixed by the State Training Board.

LOGISTIC SUPPORT:

The boarding and lodging facility will be provided at hostels of OFRC, Angul. The basic infrastructure available in the Odisha Forest Rangers College, Angul would be utilized for the smooth conduct of the aforesaid training programmes. The college bus would be used for the field tours.

BUDGETARY PROVISION:

The required funding will be met through the budget allocated from Directorate of Forest Education, Dehradun as per its norms which changes from time to time. The Director, Forestry Training should submit necessary proposal to DFE, Dehradun for financial support to undertake the Refresher Course in addition to State Funding through |Plan and Programmes budget, other sources such as CAMPA and other externally aided projects. The budget and the training programme of the Refresher Course will be decided by the State Training Board.

EVALUTION:

There would be constant monitoring and evaluation of the program to improve upon it. There will be periodical evaluation at the end of the program by the participants. Feedback from the participants will be taken for improvement of the course.

CHAPTER-4

TRAINING MANUAL FOR DEPUTY RANGERS

REFRESHER COURSE:

Since Deputy Rangers are promoted from the rank of Foresters who have been imparted with 1-year Induction Training and also having adequate field experience, a short training course of two weeks shall be imparted in order to update their knowledge in the field of forest and Wildlife.

Immediately after promotion from the rank of Foresters to the rank of Deputy Rangers they will undergo the training for a period of two weeks in order to update their knowledge and experience in forestry and wildlife to the extent they will be able to handle a Range.

COURSE STRUCTURE:

The refresher course will be for a period of two weeks (12 working days) which will cover class room studies and field tours.

SUBJECTS TO BE COVERED:

The subject and contents of such course shall be as indicated below: -

1.	Forest and Wild Life Laws (9 Classes)		Classes (60)
	(a)	Salient features of the latest amendments under Odisha Forest Act, 1972 and Wild life (P) Acts and Rules.	3
	(b)	Forest Conservation Act, 1980 and recent Guide lines	2
	(c)	Forest Right Act 2006 and PESA	2
	(d)	Biodiversity Act, Sandalwood Act, etc	2
2.	GIS and Remote Sensing (10 Classes)		
	(a)	Study of maps, Forest density	3
	(b)	GPS, PDA and its application in Forestry	3
	(c)	Compilation of Fire Data in consonance with SOP	1
	(d)	e-Green Watch, CAMPA Tracker, Control Room	2
	(e)	HRMS Modules	1
3.	Accounts and Procedure (6 Classes)		
	(a)	Changed scenario in Forest Accounts and the Accounting Modules	2
	(b)	Components under CAMPA, MGNREGS, OFSDP	2
	(c)	Establishment matters	2

4.	Afforestation Activities (13 Classes)		
	(a)	Nursery Techniques: Mega Nursery, Hi-Tech Nursery, Upgraded Nursery	5
	(b)	Various Modules: AR, ANR, Urban Tree Plantation, Avenue, Tree Outside Forest	5
	(c)	Cultivation/ Conservation of Medicinal Plants	1
	(d)	Monitoring & Evaluation	2
5.	Sustainable Forest Management (8 Classes)		
	(a)	Preparation of Working Plans	3
	(b)	Marking of Coupes and Coupe Working	3
	(c)	SSO of Timber and Bamboo Coupes	3
6.	Wildlife Management (9 Classes)		
	(a)	Habitat Management	3
	(b)	Census (Tiger, Elephant, Water Fowls, Crocodiles etc.)	2
	(c)	Tranquilization	1
	(d)	Man-Animal Conflict	1
	(e)	Depredation & Compassionate payment	2
7.	Joint Forest Management (5 Classes)		
	(a)	JFM Rules, PRA and Micro Planning	2
	(b)	Community Forestry, Agro Forestry, Social Forestry	1
	(c)	JFM under FDA, OFSDP and AJY activities	2

There will be a field tour for two days to study and acquire practical knowledge

The subject of the Refresher Course shall be decided by the State Training Board as and when required with the approval of PCCF.

DISTRIBUTION OF CLASSES:

The duration of the training will be 2 weeks i.e. 12 working days. Every day the morning session will start with Yoga / Pranayam at 6.00 A.M for 1 hour and games classes will be at 5.00 pm in order to strengthen the trainees both mentally and physically. Normal classes will commence from 9.00 A.M up to 4.30 P.M having 6 classes a day of 1 hour each.

RESOURCE PERSONS:

The resource persons will be drawn from the desired field experts. Various linked departmental officers. NGOs, Social workers, experts: educationalists would be involved in imparting necessary inputs. Remuneration to the resource persons will be provided and revised from time to time as would be fixed by the State Training Board

LOGISTIC SUPPORTS:

The boarding and lodging facility will be provided to the trainees by the respective Institution. The institution will also provide the conveyance for the field tour.

BUDGET PROVISION:

The required funding will be met through the budget allocated from Directorate of Forest Education, Dehradun as per its norms which changes from time to time. The CCF (Training & Development) should submit necessary proposal to DFE, Dehradun for financial support to undertake the Refresher Course in addition to State Funding through plan and programme Budget and other sources such as CAMPA and other externally aided projects. The Budget and the training programme of Refresher's course will be decided by the State Training Board.

EVALUATION & FEED BACK:

There will be monitoring and evaluation of the training programme at regular intervals by the Head of the institution for suggesting further improvements. There will be final feedback from the participants at the end of the training.

CHAPTER-5

TRAINING MANUAL FOR FORESTERS

Foresters recruited newly in the State are required to undergo the training on forestry, wildlife and allied subjects imparting the class room studies as well as field practices before discharging their normal duties and responsibilities in the Department in consonance with various provisions of the OFD Code, 1979.

INSTITUTE:

The trainings would be conducted at following Training Schools (Induction + Refresher) as decided by the PCCF & HoFF, Odisha.

1. Forester Training School, Bhubaneswar
2. NFTS, Champua
3. FTS, G.Udayagiri

There would be the Induction Course for a period of 1 year for Direct recruits and 4 months for promotee Foresters at the beginning and 1 week of refresher course subsequently from time to time.

DURATION OF THE COURSE:

The duration of both the induction course and refresher course would be as under.

		Induction Course	**Refresher Course**
1.	Direct recruits	1 year	1 week
2.	Promotee	4 months (subject to approval of Govt.)	-do-

The courses so covered will be the residential along with hostel facilities. The trainees shall abide by the hostel rules and are not allowed to keep their families in the hostel. They will have a self-run mess through a mess committee. It is imperative for the trainees that they will participate in the PT & Games classes as per the routine.

TEACHING FACULTY:

1. **Permanent faculty from the department**
2. **Faculty on contractual/re-engagement basis**
3. **Other Resource Persons** will be invited from the Department/ Retd. Forest Officers/ Academic

Institutions and other experts on payment of approved rate of honorarium along with the conveyance.

DRESS CODE:

The dress code of the trainees would be strictly as per the codal provisions indicated in the OFD code with respect to Foresters.

SCHEDULE OF THE TRAINING:

Every day the PT classes will be held for an hour in the morning at 6 am and the Games classes will be from 5:00 pm to 6:00 pm. Regular classes will commence from 9 am to 4:30 pm with one hour of Tea & Lunch breaks. The periods shall be of one-hour duration. The Laboratory classes shall be normally in the afternoon. On Saturdays there will be Field Exercises/ Excursions. Trainees will have to attend at least 90% of the lectures in the class and study tours. This percentage can be relaxed up to 5% by the President of the school on genuine grounds like medical, natural calamities etc.

DISCIPLINE:

Every Trainee under each such Course should maintain proper discipline and conduct both inside and outside the campus as per the instructions of the Head of the Institution. Any sort of misconduct will be viewed seriously and may lead to expulsion from the Course on approval of the CCF (T&D), Cuttack, followed by necessary Disciplinary Proceedings by the disciplinary authority. During the training course a trainee has to attend a minimum of 90% of classes. Failure to do so shall result in sending back from the training followed by disciplinary action by the appointing authority.

A. INDUCTION COURSE (1 YEAR)

The Foresters after their recruitment need to be deputed to the allotted Training Institutes by their respective Appointing Authorities on the basis of the selection made by the Chief Conservator of Forests, Training & Development Circle, Cuttack, on approval of the Principal Chief Conservator of Forests & Head of Forest Force, Odisha.

SUBJECTS TO BE COVERED & ALLOTMENT OF MARKS:

Sl. No.	Subjects	Theory	Practical	Total Marks
1	General Siliviculture	100		100
2	Forest Utilization	100		100
3	Silvicultural System and Forest Management	100		100
4	Forest Engineering	100		100
5	Forest Survey	75	25	100
6	Forest Law	100		100

7	JFM, Extension Forestry & Peoples Participation	100		100
8	Forest Mensuration	50		50
9	Wildlife Management	100		100
10	Ecology, Environment, SMC and Land-use Management	100		100
11	Accounts and Procedure	50		50
12	Forest Botany	40	10	50
13	Computer & GIS Applications	60	40	100
	Total Marks (Subjects)	**1075**	**75**	**1150**
14	Tour Marks	50		50
15	Conduct Marks	100		100
	Grand Total	**1225**	**75**	**1300**

Necessary emphasis will be given on the field practices, physical activities, general discipline, punctuality etc.

FIELD TOURS:

Besides the classroom studies, there will be Field Tours and Field Exercises for the Trainees for learning forestry practices in the field. Necessary tour examinations will be conducted and the marks obtained will be calculated towards the final results.

SYLLABUS:

1. The subject-wise detailed syllabus for the Induction Course training of the Foresters as approved by the PCCF, Odisha vide Memo No. 3724/ 3F(ME&IV) Dt. 4.3.15 is attached vide **Annexure-V(A)**. The training syllabus shall be revised from time to time by the state training board of the department. Annually once, preferably in the beginning of the calendar year, the detailed syllabus and weightage to each subject in terms of marks and number of lecture sessions allotted shall be reviewed by the training board. Changes as deemed fit shall be discussed and decided. These changes may include change of topics to be covered in the subjects, marks and lecture sessions allotted, inclusion of new subjects, deletion or modifications of some subjects (includes amalgamation and separation of subjects). After finalization by the training board the proposed syllabus shall be placed before the PCCF Odisha for approval. This exercise shall be completed within a month and in no case more than two months' time shall be taken.

CALCULATION OF EFFECTIVE WORKING DAYS

Total days available for the training – 365 days

Sl. No.	Particulars	Days
1	Sundays Excluding tour period	24
2	Second Saturdays Excluding tour period	8
3	Gazetted Holidays Excluding tour period	16
4	No. of days available for training	317
i	Joining and Registration	1
ii	Inaugural and welcome Address	1
iii	Mid- term Examination	8
iv	Final Examination	14
v	Annual Sports	7
vi	Preparation of Final Result	5
vii	Celebration of Important days	5
viii	Convocation	1
ix	No. of Lecture days' (6 Lecture per day)	188
x	Saturday excursion for Field Practical	40
xi	Study tour	47
	Total effective days	**317**

ALLOTMENT OF LECTURE HOURS:

Sl. No.	Subject	LectureHours
1	General Siliviculture	110
2	Forest Utilization	70
3	Silvicultural System and Forest Management	100
4	Forest Engineering	50
5	Forest Survey	100
6	Forest Law	100
7	Joint Forest Management, Extension Forestry and Peoples Participation	90

8	Forest Mensuration	50
9	Wildlife Management	90
10	Ecology, Environment SMC and Land Use Management	50
11	Accounts and Procedure	68
12	Forest Botany	60
13	Computer & GIS Applications	190
	Total	**1128**

OTHER TRAININGS

The trainings on handling of Arms & Ammunitions, GIS, GPS, PDA, First Aid, Tranquilizers, SMC measures etc. would also be imparted to the trainees by inviting the experts in the respective fields.

EXAMINATIONS AND FINAL RESULTS

After six months of commencement of the Training Course, there will be a Mid-Term Examination for all the subjects covered. The pass marks will be invariably 40% on each subject. The trainees failed in any subject will be warned by the Head of the Institution under intimation to the concerned appointing authorities.

The final examination will be at the end of the training session for all the subjects. In order to pass the exams, the candidates need to secure 40% marks in each subject from Sl. No. 1 to 13. The candidates securing 40% in the aggregate but failing in at most two subjects may be considered by the Board of Examiners to decide about his/her passing in examination. Failure in more than two subjects will entail failure and there shall be no further consideration. The failed candidates may appear for Supplementary examination(s) within a month of declaration of results. In case a trainee fails in a subject then he/she shall be allowed to take re-examination once. However, if a trainee has failed in re-exam also then APPOINTING AUTHORITY shall terminate the services in terms of rule 24 (2) of “The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998.

The examiners for different subjects in the Final Examination shall be selected by the CCF (T& D) or Officer nominated by him for this purpose. Dy.CF of the Training Schools or instructors will not be examiners. Officers of the rank of Assistant Conservator of Forests and higher in rank shall be the examiners.CCF (T & D) shall get multiple sets of question papers set. In case the training is being conducted in more than one school simultaneously then each school shall get a different set of question papers.

The final examination will be conducted by the CCF (T&D). Invigilators will be decided by the President with the approval of PCCF, Odisha and shall not be directly involved in training in that training school. Final result shall be compiled by the Dy.CF of the training institute.

The following medals/cups and prizes shall be awarded at the end of a course.

(a) Nicholson Medal for Top Most Trainee.

(b) Medal for Silviculture and Management.

(c) Medal for best all-round Forester Trainee.

(d) Medal for Engineering and Survey.

(e) Medal for Forest Utilisation

(f) Medal for Forest Law

(g) Medal for best Publicity Talk.

(h) Any other Medal.

(i) Cups for Cross-country (Marathon race for the trainees who finish first and second).

(j) Any other cup.

The president of the schools has the right to alter/modify the award of these medals with the approval of PCCF,Odisha.

The passed candidates will be awarded with PASS certificates from the Institute. HONOURS will be awarded for securing 75% in aggregate with pass in all individual subjects.

PROBATION

As per rule 24 of "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998 after successful completion of the training there will be one-year probation. During this one year for first one month the probationer shall be attached to the range office, and then next six months the probationer shall be given charge of a beat. After completion of these seven months the probationer shall be attached to a section. However, depending upon the requirement DFO of the concerned division may make suitable changes in this schedule with the permission of concerned RCCF. During this one-year probation the concerned DFO either himself or through his ACF shall keep a close watch on the probationer. In case the concerned DFO (Appointing Authority) feels the probationer has not completed probation period satisfactorily then he may terminate the services as provided in rule 24 (2) of "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998. In case the probationer has completed training successfully then the probationer shall be confirmed as prescribed in Rule 24 of by "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998.

B. INDUCTION COURSE (4 MONTHS) FOR PROMOTEE FORESTERS

The Foresters after promotion from the rank of Forest Guard, who have been imparted with 6 months Induction Training at Forest Guard level and also having adequate field experience, an Induction Training for a period of 4 months shall be imparted on definite subjects and syllabus. The promotee Foresters need to be deputed to the allotted Training Institutes by their respective Appointing Authorities on the basis of the selection made by the Chief Conservator of Forests, Training & Development Circle, Cuttack on approval of the Principal Chief Conservator of Forests & Head of Forest Force, Odisha.

DURATION:

The Induction Course will be for a period of 4 months and the training session will commence as decided by the Chief Conservator of Forests, Training & Development Circle, Cuttack on approval of the Principal Chief Conservator of Forests & Head of Forest Force, Odisha.

SUBJECTS TO BE COVERED & ALLOTMENT OF MARKS:

Sl. No.	Subjects	Total Marks
1	Forest Utilization	100
2	Forest andWildlife Management	100
3	Forest Engineering	100
4	Forest Survey and Mensuration	75+25
5	Forest Law	100
6	JFM and Extension Forestry	100
	Total Marks (Subjects)	**600**
14	Tour Marks	50
15	Conduct Marks	100
	Grand Total	**750**

Necessary emphasis will be given on the field practices, physical activities, general discipline, punctuality etc.

FIELD TOURS:

Besides the classroom studies, there will be the Field Tours and Field Exercises for the Trainees for practical purposes avoiding the tours by hit-and-run. Necessary tour examinations will be conducted and the marks obtained will be calculated towards the final results.

SYLLABUS:

The subject-wise detailed syllabus for the Induction Course training 4 months of the Promotee Foresters as approved by the PCCF, Odisha vide Memo No. 3675/ 2F(NG) Dt. 24.02.16 are attached separately vide **Annexure-V(B)**.The training syllabus shall be revised from time to time by the state training board of the department. Annually once, preferably in the beginning of the calendar year, the detailed syllabus and weightage to each subject in terms of marks and number of lecture sessions allotted shall be reviewed by the training board. Changes as deemed fit shall be discussed and decided. These changes may include change of topics to be covered in the subjects, marks and lecture sessions allotted, inclusion of new subjects, deletion or modifications of some subjects (includes amalgamation and separation of subjects). After finalization by the training board the proposed syllabus shall be placed before the PCCF Odisha for approval. This exercise shall be completed within a month and in no case more than two months' time shall be taken.

CALCULATION OF EFFECTIVE WORKING DAYS

Total days available for the training – 120 days

Sl. No.	Particulars	Days
1	Joining and Registration	1
2	Inaugural and welcome Address	1
3	No. of Lecture days' (6 Lecture per day)	60
4	Study tour	16
5	Final Examination	4
6	Convocation	1
7	Sundays and Holidays	37
	Total days	**120**

ALLOTMENT OF LECTURE HOURS:

Sl. No.	Subject	Lecture Hours
1	Forest Utilization	50
2	Forest andWildlife Management	60
3	Forest Engineering	50
4	Forest Survey and Mensuration	60
5	Forest Law	90
6	JFM and Extension Forestry	50
	Total	**360**

EXAMINATIONS AND FINAL RESULTS

The final examination will be at the end of the training session for all the subjects. In order to pass the exams, the candidates need to secure 40% marks in each subject from Sl. No. 1 to 6. The candidates securing 40% in the aggregate but failing in at most two subjects may be considered by the Board of Examiners to decide about his/her passing in examination. Failure in more than two subjects will entail failure and there shall be no further consideration. The failed candidates may appear for Supplementary examination(s) within a month of declaration of results.The passed candidates will be awarded with PASS certificates from the Institute. However, if a trainee has failed in re-exam also then APPOINTING AUTHORITY may revert the promote officer to his feeder grade/cadre in terms of rule 24 (3) of "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998.

For examination purpose CCF (T & D) shall get multiple sets of question papers set. In case the training is being conducted in more than one school simultaneously then each school shall get a different set of question papers. For conduct of the exams the centre in charge and invigilators shall be from outside the school. CCF (T & D) shall prepare the list of examiners for setting of question papers and list of invigilators and centre in charges and shall get the same approved from PCCF Odisha.

The following medals/cups and prizes shall be awarded at the end of a course.

a) Nicholson Medal for Top Most Trainees.

b) Medal for best all-round Forester Trainee.

c) Medal for Engineering and Survey.

d) Medal for Forest Utilisation

e) Medal for Forest Law

f) Medal for best Publicity Talk.

g) Any other Medal.

h) Cups for Cross-country (Marathon race for the trainees who finish first and second).

i) Any other cup.

The president of the schools has the right to alter/modify the award of these medals with the approval of PCCF, Odisha.

PROBATION

As per rule 24 of "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998 after successful completion of the training there will be one-year probation. During this one year for first one month the probationer shall be attached to the range office, and then the probationer shall be attached to a section/in charge of a section. However, depending upon the requirement DFO of the concerned division may make suitable changes in this schedule with the permission of concerned RCCF. During this one-year probation the concerned DFO either himself or through his ACF shall keep a close watch on the probationer. In case the concerned DFO (Appointing Authority) feels the probationer has not completed probation period satisfactorily then he may revert the promote officer to his feeder grade/cadre as provided in rule 24 (3) of "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998. In case the probationer has completed training successfully then the probationer shall be confirmed as prescribed in Rule 24 of by "The Odisha Subordinate Forest Service (Method of Recruitment and Conditions of Service of Foresters) Rules, 1998.

C. REFRESHER COURSE TRAINING FOR FORESTERS (1 WEEK)

Foresters who have been imparted with 1 year/ 4 months of Induction Training need to undergo refresher course training from time to time for a period of 1 week to update the latest forestry knowledge afresh supported with modern technology applied in the field. Besides they need to be acquainted with recent amendments in Acts and Rules of Forest Department along with various judgments of different courts on forest related matters.

The refresher course training will be at regular interval. There will be 6 working days including one day field visit. Daily there will be 6 classes of one hour each from 9.00 A.M to 5.00 P.M. with 2 hours break. The resource persons will be drawn from Forest Department/ Retired Forest Officers/ Academic institutions and other experts. The lodging & boarding will be provided to the trainees by the training institution concerned.

SUBJECTS TO BE COVERED

The subjects and contents of such course may be selected from various recent topics on Forestry & Wild Life as under:

1. Forest & Wild Life laws

Salient features of latest amended Orissa Forest Act, 1972 & Wild Life Protection Act, 1972 & the Rules made thereunder.

(a) Various provisions of I.P.C, Cr.P.C & Evidence Act relating to Forest Department.

(b) R.T.I Act, Labour Act, Forest Rights Act & PESA.

2. Accounts & Procedure

(a) Implementation of different accounting modules

(b) Implementation of CAMPA, MGNREGS & OFSDP

3. Wild Life Management

(a) Man, Animal conflict.

(b) Depredation & Compassionate payments.

(c) Wild Life Crime control

4. Joint Forest Management

(a) J.F.M Rules, P.R.A & Micro planning

(b) Community Forestry, Agro Forestry & Social Forestry

(c) JFM under F.D.A, OFSDP & AJY activities.

5. Afforestation Activities

(a) Nursery Techniques, Hi-Tech nurseries & Mega nurseries.

(b) Afforestation Modules: A.R, ANR, UTP (Urban Tree Plantation), Avenue Plantation.

(c) Cultivation & Conservation of Medicinal Plants.

6. Sustainable Forest Management

(a) Implementation of Working Plan

(b) S.S.O of timber and bamboo coupes and SMC activities.

Necessary modification in the course structure may be made by the State Training Board/ P.C.C.F, Odisha from time to time.

EVALUATION & FEEDBACK

There will be monitoring & evaluation of training programme at regular intervals by the head of the institution for suggesting further improvements. There will be final feedback from the participants at the end of the training.

CHAPTER-6

TRAINING MANUAL FOR FOREST GUARDS

A. INDUCTION COURSE

Forest Guards being the forest field functionaries at the cutting-edge level of forestry sector on recruitment to the post either through direct recruitment or by way of promotion are required to undergo induction training in order to enable them to understand various aspects of forestry and use the knowledge of forestry in discharging the normal duties and responsibilities functioning as Forest Guards in the Department.

This training manual has been prepared by integrating the guidelines for Forest Guards training in Odisha issued vide Memo No.4725 dtd.09.03.2000 and Memo No.1770 dtd.07.08.2000 of the PCCF, Odisha and the syllabus for the training course of Forest Guards approved by PCCF, Odisha and communicated to the CCF(Training & Development) Cuttack vide Memo No. 7058 dtd.22.04.2015.

TRAINING INSTITUTE

The induction training to the Forest Guards trainees will be imparted normally at FTS, Champua and FTS, G.Udaygiri and in other training institutes as would be decided by the PCCF, Odisha.

DURATION OF TRAINING

The duration of the induction course for the Forest Guard trainees will be of 6 (six) months. The course will be residential with hostel facilities. The medium of instruction in the training school will be ordinarily Odia or mixed Odia and English subject to any change that may be ordered by the President.

On preparation of Select List for various categories of candidates (directly recruited and promotees), the Appointing Authority shall intimate the Chief Conservator of Forest, Training & Development Circle for allotment of seats in the Training Schools. The Chief Conservator of Forest, Training & Development Circle after receiving the intimation from the Appointing Authorities shall prepare a consolidated list of trainees for undergoing training, school wise, in different sessions and send the same to the Principal Chief Conservator of Forests, Odisha for approval. After obtaining approval of the Principal Chief Conservator of Forests, Odisha; the Chief Conservator of Forest, Training & Development Circle shall notify the names of candidates (school wise and session wise) for undergoing training.

GUEST FACULTY

In addition to the regular teaching faculty, a resource pool for various subjects of each of the training institute will be prepared by the respective DCFs and the same will be approved by the CCF (Training & Development). The resource pool will consist of various subject matter specialists / experts from Forest Department/ Other Line Departments/ Educational Institutions etc. who will be invited as Guest Faculties and Honorarium as fixed from time to time shall be paid for the purpose.

The Deputy Conservator of Forests will be responsible for the administration of the school and control of accounts, subject to overall control of the President. He shall also be responsible for smooth, regular and complete conduct of the course of studies, examinations and field tours as well as upkeep of school. He shall also make correspondences to all concerned related to school matters. He shall inspect the class during tour at least once. He shall make surprise inspection of lectures delivered by the Senior Instructors/ Instructors / Assistant Instructors to ascertain the quality of teaching.

Subject to general control of the Deputy Conservator of Forests, the Instructors, besides delivering lectures, shall remain in charge of library, museum, stores, students mess and accompany the trainees on tour and such other work as may be assigned to them by the Deputy Conservator of Forests / Senior Instructor from time to time. Allocation of subjects for teaching among the Instructors will be decided by the Deputy Conservator of Forests in consultation with the Senior Instructor. The Assistant Instructor(Deputy Ranger) can take classes on some minor subjects but he will mainly remain in charge of Nursery, Library and Stores, etc. and also accompany the class during field tours.

SUBJECTS FOR INDUCTION TRAINING OF DIRECT RECRUIT

FOREST GUARDS

The induction training of Forest Guards will be for 6(six) months and the subjects to be covered and subject wise allotment of marks are as follows:

SUBJECT WISE ALLOTMENT OF MARKS

Sl. No.	Subjects	Theory	Practical	Total
1	General Silviculture	100	-	100
2	Survey, Mensuration & Engineering	75	25(Survey)	100
3	Forest Utilization	50	-	50
4	Forest Botany	40	10	50
5	Forest Law	50	-	50
6	Wild life Management	50	-	50
7	Accounts & Procedure	50	-	50
8	Environment Conservation	50	-	50
9	Forest Management & Protection	50	-	50
10	Communication & Forest Extension	50	-	50
11	Computer & GIS Applications	60	40	100
12	Nursery	-	-	
13	Total Subject Marks	625	75	700
14	Tour Marks	50	-	50
15	Conduct Marks	100	-	100
	GRAND TOTAL	**775**	**75**	**850**

The detailed syllabus as approved by the PCCF, Odisha vide his Memo No.7058 dtd.22.04.2015 is enclosed in **Annexure- VI .**The training syllabus shall be revised from time to time by the state training board of the department.

For passing in the final examination a candidate is to secure 40% marks in each subject and also in aggregate. Any candidate securing 40% in aggregate but failing in individual subject will be considered by the Board of Examiners.

ATTENDANCE AND PARTICIPATION

Each candidates/trainee will have to attend at least 95 percent of the lectures in the class and on equal percentage on study tours to become eligible for appearing at the final examination. However, the President of the School can relax this attendance requirement by 05 (five) percent on medical ground or due to natural disasters beyond the control of the trainee. The disqualified candidates will be sent back. The direct recruited Forest Guard trainees may join the next batch of training at their own cost.

Candidate (In service Forest Guards) not able to follow the course shall be sent back to the respective Appointing Authority within one month of the admission/commencement of the course by the President on recommendation of the Director of the school.

Any candidate resorting to gross breach of discipline or moral turpitude shall be issued with a warning along with deduction of conduct marks (05 marks) for each occurrence by the Director of the School. If the above-mentioned attitudes are repeated, such trainees shall be declared as unsuitable and sent back.

In-service Forest Guards are required to pass the training in two consecutive chances. In-service Forest Guards trainees falling short of required attendance shall not be allowed to appear at the final examination and be sent back. The appointing authority shall take action against such Forest Guards as deemed proper.

TOURS

The detailed tour programme of each field visit will be approved by the President and sent to all concerned for their information, guidance and cooperation well in advance.

As far as possible, the Divisional Forest Officer or the Assistant Conservator of Forests shall accompany the trainees when they are on tours in his territory to impart practical training on the spot. The local Forest Ranger shall accompany the trainees positively and he shall also render all possible assistance and help to the trainees during their stay.

EXAMINATION

The mid-term examination will be conducted to assess the performance of candidates. The question papers of mid-term examination will be set by the Dy.CF in consultation with Senior Instructors and Instructors of the individual institute.

There will be two examinations out of which the final examination will be a combined one and will be held at a place to be decided by the President. Marks secured in the mid-term examination as well as tour examinations will be taken into account for preparing final merit list.

Candidates who fail in one subject in the mid-term examination or in one tour examination or both shall be warned in writing by the Dy.CF of the school under intimation to all concerned. A candidate shall be awarded with pass certificates provided he/she secures pass marks in all subjects and in aggregate i.e. 340 marks out of 850 marks in the final examination.

Trainees securing pass marks in all subjects and 75% or more in aggregate shall be awarded with "Honours Certificate" whereas other successful trainees will be awarded with "Pass Certificate" only.

Trainee resorting to unfair means during mid-term/final examination his/her answer paper in question shall be scratched by the Dy.CF of the School. He/she shall be debarred from writing test of the papers and sent back by the President of the school on recommendation of the Dy.CF of the School. Appointing authority shall initiate disciplinary action against such trainee Forest Guard.

There shall be a meeting of Board of Examiners one day in advance of the passing out ceremony under the Chairmanship of the president to finalise the result, prizes/medals. The board shall consist of the following members.

1. Deputy Conservator of Forests of all the Training Schools.
2. Director, Forest Rangers College, Angul.
3. Examiners of Major subjects
4. Two nominees (not below the rank of ACF) of PCCF Odisha

The examiners for different subjects in the Final Examination shall be selected by the President or Officer nominated by him for this purpose. Dy.CF of the Training Schools or instructors will not be examiners. Officers of the rank of Assistant Conservator of Forests and higher in rank shall be the examiners.

The final examination will be conducted by the CCF (T&D). Invigilators will be decided by the President with the approval of PCCF, Odisha and shall not be directly involved in training in that training school. Final result shall be compiled by the Dy.CF of the training institute.

The following medals/cups and prizes shall be awarded at the end of a course.

a) Dr. Mooney's Medal for Top Most Trainee.
b) Medal for Silviculture and Management.
c) Medal for best all-round Forest Guard Trainee.
d) Medal for Engineering and Survey.
e) Medal for best Public Talk.
f) Any other Medal.
g) Cups for Cross-country (Marathon race for the trainees who finish first and second).
h) Any other cup.

The president of the schools have right to alter/modify the award of these medals.

The directly recruited Forest Guards will receive the stipend from the Director as fixed by Government from time to time. Promoted and In-service Forest Guards trainees will receive their usual Pay, D.A., etc. from their respective Divisions during their period of training.

If any question arises relating to interpretation of the manual, it shall be referred to the state training board of the Department.

B. REFRESHER COURSE MODULE FOR FOREST GUARDS

Forest Guards need to undergo the refresher course to meet the changing scenario and requirements of forest management. They need to be updated with the skill and processes to handle technological changes and various emerging priorities within the forestry sector. Although a systematic training need analysis of the in-service Forest Guards who have already undergone Induction Training in various training schools through a consultative process is necessary to prepare detailed refresher course module, an attempt has been made to outline refresher course module for the Forest Guards basing on the present situation.

Target groups & Institutional arrangement:

In-service Forest Guards with more than 3 years of service are to be exposed to various refresher courses of one-week (6 days) duration. The Regional Chief Conservator of Forests of different Circles will organise these refresher courses for the in-service forest guards working within their jurisdiction (Forest Guards of Territorial, Kendu Leaves, Wild Life and Development Wings). The Regional Chief Conservator of Forests will draw the programme for the refresher courses & arrange suitable resource persons, venue, etc. well in advance, get it approved by the PCCF,Odisha and intimate the same to all the wings for inviting nominations. Ideally one batch of 30 participants (Forest Guards) will attend the refresher course.

Refresher courses on various themes

Five such refresher courses have been proposed covering various themes. The themes along with the topics to be covered in various refresher courses are detailed below:

1. Forest Protection & Forest Fire Management

Sl. No.	Theme	Topics	Total Class to be taken
1	Forest Protection	i) Roles & responsibility of different field functionaries in forest protection	2
		ii) Salient features of Odisha Forest Act. & Wild Life Protection Act. and Rules	4
		iii) Forest offence detection & procedure (preparation of seizure list, custody of seized produce, arrest, drawing of FIR & preliminary inquiry, and deposition of evidence before the court & authorised Officer etc.)	4
		iv) Foot patrolling & group patrolling, detection & prevention of encroachment boundary verification, detection of illicit felling, direct & indirect evidence on presence of wildlife.	3

2	Forest Fire	i) Causes of forest fire and its impact on eco-system	2
		ii) Detection & mapping of forest fire vulnerability areas	2
		iii) Forest fire prevention methods	2
		iv) Forest fire alert system of FSI by using of MODIS & SNPP satellites and forest fire reporting using GPS PDA.	2
		v) Forest fire control by using traditional & modern tools and community involvement and co-ordination with Fire Services Department.	3
		vi) Awareness and Training of Forest fringe villagers for prevention of forest fire.	1
		vii) Field visit to theft & fire prone forest areas	1 day

2. Rescue, prevention of accidental death of wild animals and anti-depredation measures.

Sl. No.	Theme	Topics	Total Class to be taken
1	Wild Life Rescue & rehabilitation	i) Various methods of rescue, treatment and release of wild animals	2
		ii) Treatment procedure of injured / diseased wild animals.	2
		iii) Tranquillization and translocation of difficult / rouge wild animals	2
		iv) Demonstration of tranquillization technique	1 day
2	Prevention of accidental death	i) Preventive measures of accidental death of wild animals (elephant) due to train hit (identification of vulnerable sections, use of signages, tracking of elephant herds reduction of train speed by effective information sharing with the railway staff by use of VHF network and mobile phones.)	2
		ii) Preventive measures of accidental death of wild animals due to electrocution (regular patrolling, joint verification of vulnerable areas, rectification of sagging, fixing interposing poles, use of spikes and destruction of illegal hooking and booking of wild life offence cases.	2
3	Anti-depredation measures	i) Causes & effect of wild life depredation.	2
		ii) Compassionate payment assessment for human death, cropand house damage by wild animals.	2

		iii) Safe driving method of wild elephants from human habitation through community participation	2
		iv) Experience sharing of best practices by the participants	3
		v) Preventive steps against elephant depredation viz: construction of elephant proof trench, solar fencing of vulnerable areas, adequate lighting of hamlets and creating awareness against brewing of home-made alcohol.	2
		vi) Tracking of elephant herd movement & movement of lone tuskers, dissemination of information and adoption of early warning system.	2
		vii) Management of law & order situation through effective co-ordination with district administration	2

3. Nursery techniques for production of QPM & afforestation techniques for successful plantation

Sl. No.	Theme	Topics	Total Class to be taken
1	Nursery technique	i) Different types of nurseries	2
		ii) Site selection, choice of species and quality seed collection.	2
		iii) Preparation of potted & root trainer seedlings	4
		iv) Use of modern techniques in nursery (Agro net shade, mist chamber, etc.)	2
		v) Practical demonstration on nursery technique	5(1 Day)
2	Afforestation techniques	i) Different types of afforestation (AR, ANR, Avenue, Bald hill Plantation, urban plantation, sacred grooves, etc.)	2
		ii) Pre-planting operation methodology (survey demarcation, pillar posting, site clearance, alignment staking, SMC & pitting).	2
		iii) Planting techniques	1
		iv) Post planting operations and subsequent maintenance	2
		v) Experience sharing of best practices on nursery & plantation.	3
		vi) Visit to successful plantation sites under different models	1 day

4. Forest working & SMC works

Sl. No.	Theme	Topics	Total Class to be taken
1	Forest working	i) Selection coupe working	2
		ii) Improvement working	1
		iii) Rehabilitation working	1
		iv) Subsidiary SilivicultureOperation	1
		v) Field tour to a selection crops	5(1 day)
		vi) Bamboo working	1
		vii) Bamboo silviculture operation	1
		viii) Field tour to Bamboo working&Silviculture operation Area and demonstration	5(1 day)
		ix) Experience sharing of best practices by participants	1
2	SMC	i) Need for SMC	1
		ii) Planning for SMC	2
		iii) Different types of SMC measures	2
		iv) Field tour to SMC work	5(1 day)
		v) Sharing of best practice by participants	2

5. Use of Computer, GIS, GPS & PDA in Forestry

Sl. No.	Theme	Topics	Total Class to be taken
1	Computer	i) Basics of Computer	2
		ii) Use of internet, server & its use	2
		iii) Map reading	2
		iv) Practical on map reading	2
2	GIS	i) Basics of GIS	2
		ii) GIS & its application in forestry	2
		iii) Practical implementation	3
3	GPS PDA	i) GPS PDA and its use in Forestry	2
		ii) Use of GIS tools in Forestry in Android App	3

4	Forest Survey & patrolling	i) Forest patrolling practical	5(1 day) (Practical)
		ii) Incident reporting practical	
		iii) Forest Survey	
		iv) Project Area survey	
5	Mapping & Survey	i) Asset Mapping Practical ii) Working plan sample point survey practical	5(1 day) (Practical)

CHAPTER-7

TRAINING MANUAL OF MINISTERIAL STAFF

Forest Department personnel in general are well trained across the hierarchy. Ministerial staff features as an essential human resource within the ambit of office unit. The efficacy of functioning is supported by the staff to a large extent. However, there is no formal induction training and in-service training of ministerial staff with exception to Accounts training which is imparted by the Institute of M.D.R.A.F.M, Bhubaneswar.

In order to maintain standard of existing ministerial staff as well as new entrant, capacity building to improve their efficiency in discharging various official works is essential. The training shall be imparted ina batch not exceeding 30 at state/circle /division level as decided from time to time to achieve the following objectives.

1. To enhance skills in IT knowledge as most of the reports being sent online.
2. To enhance of skills- Advance Drafting, Noting, Reporting and documentation
3. Training on various applications used in the Department. Example- GIS/Online Accounting, HRMS functioning, IFMS Portal, FC Act guideline and online processing/ Levies & payment, RTI, Forest Rights Act, Forest Code and Service Matters/Record Keeping etc.

(A) Accounts Training (Compulsory)

Sl. No.	Subject	Duration
1	Accounts Institute of M.D.R.A.F.M Bhubaneswar	01 month

(B) Induction Training (Refresher Courses for in-service)

Short Term refresher course for duration of **two weeks** on various subjects shall be conducted in order to meet changing requirements. Resource persons for the training shall be drawn from the existing in-service officers, retired officers or others having expertise in the subject. The detail course contents on the following topics will be prepared by the concerned institute/ RCCF/CCF (T& D)/DFO.

Sl. No.	Course Subject	Duration in weeks
1	Orientation to various Sections of Division office/Circle office/Head office, Basic Internet Knowledge	02 weeks
2	Enhancement of soft skills- drafting, noting, reporting, documentation and maintenance of records	

3	Training on applications used by Forest Department such as GIS/ Accounting, Online HRMS functioning, IFMS Portal, and e-green portal	
4	FC Act guideline and online processing/ payment.	
5	RTI, Forest Rights Act	
6	Forest Code / Estt. Service Matters proceedings.	
7	Working Plan-Coupe working	
8	Wildlife Human Conflict, Wildlife Depredation & Compassionate Grant	
	Legal Matters: Orissa Forest Act	
	Kendu leaf Operation	

EVALUATION & FEED BACK:

There will be monitoring and evaluation of the training programme at regular intervals by the Head of the institution for suggesting further improvements. There will be final feedback from the participants at the end of the training.

Annexure-I

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS,
ARANYA BHAWAN, CHANDRASEKHARPUR, BHUBANESWAR-23.

Office Order No. 119-12F(NG)-09/18 Dated. 24th January, 2018

The Forest and Environment Department in recent years have reformed its organisational structure along with its personnel in different sectors. The need based training curriculum after recruitment or promotion or in-service training in different cadres requires changes/ modifications as per the objective of Forest administration & management. In order to oversee and take a holistic decision on different Capacity Building Programmes for Forest Officials/ Ministerial Staffs as well as for VSS/EDC Members and other stakeholders, a Board is constituted under the chairmanship of PCCF, Odisha in the name of "Training Board of Forest Department, Odisha" with the following members.

1.	Principal CCF, Odisha	Chairman
2.	Addi. PCCF (ME&IV)	Member
3.	Regional Chief Conservator of Forests, Berhampur	Member
4.	Regional Chief Conservator of Forests, Rourkela	Member
5.	Regional Chief Conservator of Forests, Angul	Member
6.	Regional Chief Conservator of Forests, Bhubaneswar	Member
7	Chief Conservator of Forests (Personnel & Administration)	Member
8	Chief Conservator of Forests (Training & Development)	Member-Convener

Sd/-

(S. C. Mishra)
Principal Chief Conservator of Forests,
Odisha

Memo 1535 / Dt. 24.01.2018

Copy forwarded for information and necessary action to:

1. The Additional Chief Secretary to Government of Odisha, F&E Department.
2. All the members of the Committee.
3. Copy forwarded to the Addl. PCCF (ME&IV)/C.C.F (P&A)/S.A.O, O/o PCCF, Odisha

Sd/-
Principal Chief Conservator of forests, Odisha

Annexure-II

सत्यमेव जयते

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE

Dr. Rekha Pai

INSPECTOR GENERAL OF FORESTS

D.O. No. 15011/10/2010-IFS-II

Dated: 18th March 2016

Dear

As you may be aware that the revision of curriculum of IFS Probationers with amendment of IFS (Probationers' Final Examination) Regulations 2016 has been published in the Gazette of India vide Ministry of Personnel, Public Grievances and Pensions Notification GSR No 270(E) dated 02/03/2016. The same is available at http://ifs.nic.in/actrules. With this curriculum, the two year probation period shall be divided into three parts, Foundation Course, LBSNAA (4 months), Professional Course, IGNFA (16 months) and On the Job Training (OJT) in the respective cadre (4 months). The probationers of 2014-16 on completion of their Professional Course at IGNFA, Dehradun, will be relieved from the academy on 2nd May 2016 (Monday) forenoon to join respective cadre for the On the Job Training.

It is therefore requested that adequate steps may be taken for arrangement of On the Job Training of these probationers. For the sake of uniformity in OJT, across all cadre, the following schedule is proposed:

Division Attachment	1 Week
Circle Attachment	1 Week
District Attachment	1 Week
Range Attachment	12 Weeks
Forest HQ Attachment	1 Week

On completion of the OJT, assessment report may kindly be sent to Director, IGNFA, Dehradun within a month.

Yours sincerely

(Dr. Rekha Pai)

To,

PCCFs of all States

Copy to:

1. Pr. Secretary Forests of all states.
2. Director, IGNFA, Dehradun for information. With reference to para 4(c) of the letter dated March 2016, IGNFA will be the nodal point for receiving the response from LBSNAA as well as respective state cadres and inter-se seniority details.

Annexure-III

{PUBLISHED IN PART II, SECTION 3, SUB-SECTION (i) OF THE EXTRAORDINARY GAZETTE OF INDIA VIDE GSR NO. 466(E) DATED 22-07-2004}

Entrance and Training Rules (Revised), 2004 for Forest Range Officers

NOTIFICATION

SECTION-I : GENERAL

The Central Government, after consultations with the States concerned, hereby make the following rules, namely:

1. **Short Title and Commencement:** These Rules may be called as Entrance and Training Rules (Revised), 2004 for the Forest Range Officers.

   i. Their jurisdiction extends over whole of India.
   ii. These shall come into force with effect from the academic session beginning April 2005.

2. **Definitions**: In these Rules unless there is anything repugnant in the subject or context:

   i. **"Commission"** means Public Service Commission of the State/ Union Territory or Union Public Service Commission as the case may be.
   ii**.** **"College/School/Institute"** means a Forest Range Officers Training College / School / Institute run by Government of India or a State Government.
   iii. "**Course**" means training programme of eighteen months duration leading to award of certificate in Forestry at Forest Range Officers Training College/School/Institute.
   iv. **"Director, Forest Education**" means an officer authorized by the Ministry of Environment and Forests, Government of India to exercise control over the Forest Range Officers Training Colleges/Schools/Institutes in India.
   v. **"Examination"** means theory or practical examination or test included under Rules 17 to 25.
   vi. **"Faculty"** means (a) Director, Forest Education and any other officer in the Directorate associated with teaching and (b) Principal, Instructor, Assistant Instructor, Scientist and Physical Training & Games Instructor of the College/School/Institute.
   vii. **"Government"** means the Government of India, State Government or Government of the Union Territory or Foreign Government, as the case may be.
   viii. **"Officer Trainee"** means a candidate who conforms to these Rules and deputed by the Sponsoring Authority.
   ix. **"Principal"** means the Principal of a Forest Range Officers Training College/School/ Institute.
   x. **"Rules"** means Entrance and Training Rules (Revised), 2004 for Forest Range Officers.
   xi. **"Sponsoring Authority"** means Government of State/Union Territory/Foreign country sponsoring a candidate.

xii. **"Study tour"** means tour arranged during the course by the Principal outside the headquarters and excludes the journey time.

xiii. **"Subject"** means an individual subject mentioned under Rule 15.

3. The Principal shall be overall in-charge of general administration, which includes organizing and conducting the training courses, discipline and control over accounts etc., subject to over all supervision of Director General of Forests and Special Secretary, Government of India, Ministry of Environment and Forests.

SECTION-II : ADMISSION RULES

4. Categories of Candidates: - There shall be two categories of candidates:

(i) Candidates sponsored by the State/Union Territory.

(ii) Candidates sponsored by a Foreign Country.

5. Allotment of seats:- The Director, Forest Education shall decide the number of 'Officer Trainees' for category (i) of Rule 4 to be admitted giving due regard to the requirements of sponsoring authorities. He shall communicate the number of seats allotted in the respective college to the sponsoring authority well in advance of the commencement of the course. In case of demand of seats belonging to category (ii) of Rule-4, the Director, Forest Education shall communicate such allotment to respective sponsoring Governments under intimation to Government of India. In case, any sponsoring authority is not in a position to utilize full number of seats allotted in a particular year, it will intimate the same to the Director Forest Education well in time.

6. Selection:

(a) Selection of a candidate shall rest with the concerned Sponsoring Authority.

(b) The selection procedure adopted by the Sponsoring Authority must conform to the minimum standards laid down under Rule 7 to 11 for the candidate belonging to category (i) Rule 4.

(c) Candidates belonging to category (ii) of Rule 4 must conform to requirements of Rules 8 to 10.

7. Age: The minimum and maximum age limit shall be as prescribed in the Recruitment Rules of respective Sponsoring Authorities.

8. Educational qualification: Candidates must possess Bachelor's degree (or equivalent) in Science or Engineering of any recognized university with at least one of the following subjects:-

i. Agriculture
ii. Botany
iii. Chemistry
iv. Computer Applications/ Computer Science
v. Engineering (Agriculture/ Chemical/ Civil/ Computer/ Electrical/ Electronics/ Mechanical)
vi. Environmental Sciences

vii. Forestry
viii. Geology
ix. Horticulture
x. Mathematics
xi. Physics
xii. Statistics
xiii. Veterinary Science
xiv. Zoology.

9. (a) The minimum standards for height and chest girth for candidates of category (i) of Rule 4 shall be as follows:

	Height (cm)	**Chest girth (cm)**	
		Normal	Expansion
Male candidate	**163**	**84**	**05**
Female candidate	**150**	**79**	**05**

The following minimum height standards may be allowed in case of candidates belonging to Scheduled Tribes and races such as Assamese, Bhutanese, Garhwalis, Gorkhas, Kumaonis, Ladakhese, Mizo, Naga, Nepalese, Sikkimese and those from Arunachal Pradesh, Lahaul & Spiti, Meghalaya:

Male candidate 152 cm.
Female candidate 145 cm.

(b) Male / Female Candidates must pass a physical test covering a distance of 25⁄16 Kms. within four hours on foot, respectively.

(c) Candidates of category (ii) of Rule 4 should conform to the standards mentioned above.

10. **Health Certificate**: (a) Sponsoring Authority shall arrange for medical examination by a Medical Board for candidate of category (i) of Rule 4. Medical Board shall issue health certificate and also certify that the candidate is fit to undertake strenuous outdoor work in Forest Department.

Candidate of category (ii) of Rule 4 shall be required to produce the health certificate issued by the competent authority.

11. **Competitive Examination** -Candidate of category (i) of Rule 4 shall be selected on the basis of competitive written examination and interview to be conducted by the Commission. The Commission shall prepare merit list on the basis of total of marks obtained in written examination and interview.

(a) Written examination:
The written examination shall be held in the following manner:

Compulsory Subject:

1. General Knowledge 100 marks.
2. English (essay and précis writing etc.) 100 marks.

Optional Subjects:

3. Any two subjects out of the following 200 marks (each)

i. Agriculture
ii. Botany
iii. Chemistry
iv. Computer Applications/ Computer Science
v. Engineering (Agriculture/ Chemical/ Civil/ Computer/ Electrical/ Electronics/ Mechanical)
vi. Environmental Science.
vii. Forestry
viii. Geology
ix. Horticulture
x. Mathematics
xi. Physics
xii. Statistics
xiii. Veterinary Science
xiv. Zoology

(The standard of these subjects shall be that of a Bachelor's degree)

Note: No candidate shall be allowed to take more than one subject of the group (i) Agriculture, Agricultural Engineering and Veterinary Science (ii) Chemistry and Chemical Engineering (iii) Computer Application/ Computer Science and Computer Engineering (iv) Electrical Engineering and Electronic Engineering (v) Mathematics and Statistics.

(b) Interview:

The Commission shall conduct an interview for the candidate who qualifies in the written examination. The maximum marks for interview shall be 75.

12. Nominations:

(a) Name of the candidate selected for admission, together with attested copies of all certificates prescribed in Rule 13 should reach the Director, Forest Education at least 45 days before commencement of the Course.

(b) Selected candidates shall be required to join the allotted College on the first day of commencement of the course. However, in exceptional circumstances, this is extendable upto 30 days by the Principal.

13. Certificates:

The following certificates, in original, must be submitted by the candidate for verification to the Principal at the time of admission:

(a) Proof of age
(b) Bachelor's Degree
(c) A certificate of physical test issued by Competent Authority

(d) Certificate of health issued by Medical Board

(e) Appointment/ Nomination letter issued by the Sponsoring Authority.

SECTION-III : THE COURSE

14. **Duration** - The duration of the course shall be of eighteen months. There shall be a term break of 30 days during the course. Principal may fix time of term break. The period of term break shall count towards earned leave.

15. **Subjects**: The subjects to be taught during the course are:

FIRST PHASE

S. No.	Subjects
1	General Botany/ Mathematics
2	Applications of Modern Tools and Technology
3	Silviculture – I
4	Silviculture – II
5	Forest Resource Assessment
6	Forest Survey
7	Forest Engineering
8	Adverse Influences on Forests
9	Forest Utilization – I

SECOND PHASE

S. No.	Subjects
1	Forest Policy and Law
2	Ecology and Environmental Sciences
3	Forest Utilization – II
4	Forest Resources Management
5	Natural Resource Management
6	Forest Economics
7	Biodiversity Conservation and Management
8	Joint Forest Management, Rural and Tribal Development
9	Human Resources Development and Management
10	Forest Accounts and Office Procedures.

16. **Study tours and field exercises -**In addition to the subjects enumerated above, study tours and field exercises shall be conducted during the course as decided by the Principal. Study tours will cover the practical aspects of training. Field exercises on road alignment, engineering, working plan and ecological census techniques shall also be conducted during the course. In addition training in weapons, motor mechanics and first aid shall also be imparted.

17. Examinations -There shall be two examinations each held during the First and Second Phase. The schedule of examination will be decided by the Principal.

Maximum marks for each subject shall be as follows:

FIRST PHASE

Sl. No.	Subjects	Theory	Practical	Total
1	General Botany / mathematics	100	0	100
2	Application of Modern Tools and Technology	150	50	200
3	Silviculture- I	150	50	200
4	Silviculture- II	200	0	2001
5	Forest Resource Assessment	150	50	200
6	Forest Survey	150	100	250
7	Forest Engineering	100	100	200
8	Adverse Influence on Forests	150	50	200
9	Forest Utilization-I	150	50	200
	Total	**1300**	**450**	**1750**

SECOND PHASE

Sl. No.	Subjects	Theory	Practical	Total
1	Forest Policy and law	250	0	250
2	Ecology and Environmental Science	200	0	200
3	Forest Utilization -II	150	0	150
4	Forest Resources Management	200	0	200
5	Natural Resource Management	150	50	200
6	Forest Economics	200	0	200
7	Biodiversity Conservation and Management	200	50	250
8	Joint Forest Management, Rural and Tribal Development	150	0	150
9	Human Resources Development and Management	150	0	150
10	Forest Account and Office Procedure	100	0	100
	Total	**1750**	**100**	**1850**

18. Any 'Officer trainee' who fails to obtain at least 50% of the total marks in a subject listed in Rule 17 shall be considered to have failed in that subject.

19. No 'Officer Trainee' whose attendance at the College falls below 80% shall be permitted to appear in the Examination. If an 'Officer Trainee' misses more than 10% of any tour he/ she shall have to repeat the missed portion unless exempted by the Principal. If an 'Officer Trainee' fails in not more than three subjects, he/she shall be required to appear in supplementary examination(s) in the paper(s) he/she has failed. The supplementary examination(s) shall be conducted by the Principal at the end of the First Phase or Second Phase, as the case may be.

Marks originally obtained in such subjects shall only be counted towards merit. If he/she fails in more than three subjects or again in supplementary examination, even in one subject, he/she may be required to repeat the full academic year course.

20. **Re-examination** - An 'Officer Trainee' may be allowed to appear in re-examination if he remains absent with prior permission of the Principal due to any of the following reasons:

a. Bereavement/ serious illness of parents, brother, sister, wife, son, daughter.

b. Hospitalization/ confinement to bed.

c. To attend court/duty in the interest of Government.

Marks obtained in such an examination shall count towards merit.

21. **Study tours and field exercises assessment -** There shall be three study tours during First Phase and two study tours during Second Phase. Total number of days dedicated for tours shall be 145. Performance of the 'Officer Trainee' during study tour and field exercises shall be assessed in the First and Second Phases in the following manner:

Tour/Field Exercises	**Max. Marks (each tour)**
(I) Tour examination	80
(ii) Tour journal	50
(iii) Quiz test	20
(iv) Tour symposium	20
(v) Botanical collection	30
Total:	**200**
Total marks in Five tours	**1000**

Assessment in respect of field exercises shall be made towards the end of First and Second Phase. Allotment of marks for field exercises shall be as under:

Field Exercise	**Phase**	**Max Marks**
i. Nursery, Plantation and Cultural operation	I	40
ii. Mensuration	I	40

iii. Marking and logging	I	20
iv. Road Alignment	I	50
v. Engineering	I	50
vi. Working Plan	II	150
vii. Ecological Census Techniques	II	50
Total		**400**

22. **Study tours** - If an 'Officer Trainee' fails to appear in any tour examination/ quiz test/ symposium or does not submit tour journal and botanical collection he/she shall be awarded zero marks in the concerned item. In case the absence is due to the reasons mentioned in Rule 20, the 'Officer Trainee' shall be awarded average of the marks obtained in previous tour examinations.

23. **Viva-Voce**: At the end of Second Phase each 'Officer Trainee' shall be required to undergo Viva before a panel of experts who shall evaluate knowledge of the trainee. There shall be a maximum of 200 marks for viva-voce.

24. **Conduct marks -** Based on overall conduct, each 'Officer Trainee' shall be awarded conduct marks out of maximum of 250 marks at the end of the course. Allocation of these 250 marks will be based upon five criteria, each consisting of 50 and shall be given by every member of the faculty including the Principal to each candidate. The Principal and the faculty shall have similar weightage. The final conduct marks will be the average of the marks given by the Principal and the faculty members. The criteria shall be

(a) Attendance

(b) Discipline

(c) Interpersonal relations with peers

(d) Interpersonal relations with faculty

(e) Extra curricular activities

25. **Abstract of marks for the course**

S. No.	Item	First Phase	Second Phase	Total
1.	Written Examination	1750	1850	3600
2.	Tour Examination	600	400	1000
3.	Field Exercise	200	200	400
4.	Viva-voce	—	200	200
5.	Conduct marks	—	250	250
Total		**2550**	**2900**	**5450**

26. **Final order of merit** - At the end of the course, a list shall be prepared showing final order of merit based on the marks obtained in examinations and on assessments as per provision in Rule 16 to 25.

27. **Certificate**: Following category of Certificate shall be awarded to the successful 'Officer Trainee' at the end of the course:

1. **Honours' Certificate:** An 'Officer Trainee' who has obtained 75% and above of the total number of marks provided he has cleared all subjects in first attempt.

2. **Pass Certificate:** An 'Officer Trainee' who has obtained (i) not less than 50%, or (ii) more than 75% and above of the total number of marks, but not cleared all subjects in first attempt.

28. The prizes may be awarded to the meritorious 'Officer Trainee' according to the guidelines framed for award of such prizes

29. **Progress Report**: Report on performance and conduct of each Officer Trainee shall be issued by the Principal during and / or at the conclusion of the course and sent to the Sponsoring Authority.

SECTION-IV : GENERAL RULES

30. **Tuition Fee** - The amount of tuition fee, stipend, tour expenses, caution money and equipment allowance may be determined from time to time as considered necessary by the Director Forest Education in consultation with the Principals. The Sponsoring Authority shall pay such amount at the time of admission of the candidate.

31. **Salary** - The Sponsoring Authority shall transfer the amount equivalent to the salary of 'Officer Trainee' to the Principal on time.

32. **Orders and directions of the Principal** - In order to smoothly conduct the training courses, to control and manage the day-to-day business, and to deal with any matter concerning training, and the conduct of trainees, the Principal may, in addition to and in keeping with the provisions of these Rules, issue Standing Orders and directions in any suitable form. Such orders and directions which may be on subjects like hostel accommodation, dress, equipment, use of spectacles, breakage, mess regulations, physical training and games, sports and extra curricular activities, regulations of visitors in the hostel, keeping of animals and motor vehicles, illegal possession of arms, and any other issues considered relevant by the Principal, shall be binding on all the 'Officer Trainees' attending the course.

33. **Absence**:

(i) **From Training**: No 'Officer Trainee' shall leave the headquarters without prior permission of the Principal nor shall any 'Officer Trainee', while in camp, leave the camp headquarters without written order of the Officer-in-Charge who shall intimate such absence to the Principal, if it exceeds 2 days.

(ii) **From the hostel**: No 'Officer Trainee' shall be allowed to be absent from the hostel after 10 p.m. without permission of the Principal or his nominee designated as House Tutor.

34. **Discipline and Control: (a)** Without prejudice to any of the conduct rules and other rules that the concerned sponsoring authorities may have stipulated for compliance by the 'Officers Trainees', violation or non-compliance by an 'Officer Trainee' of any of the provisions of these rules/orders and directions issued under Rule 32 would invite disciplinary action by the Principal, which may include warning, deduction of conduct marks and imposition of fines. Decisions of the Principal in such cases shall be final and binding upon the 'Officer Trainee' concerned.

(b) In cases where violation or non-compliance of the Rules or any of the orders issued under Rule 32 is of serious nature, and the Principal considers that the provisions of the disciplinary action he is authorized to take under sub-rule (a) are inadequate and inappropriate, he may refer the matter to Director, Forest Education, under intimation to the concerned sponsoring authority, recommending reversion of the 'Officer Trainee' to his/her sponsoring authority.

(c.) Director, Forest Education, after due consideration of the report made by Principal, may order reversion of the 'Officer Trainee' concerned to his/her sponsoring authority. An order of reversion under this sub-rule by the Director, Forest Education may be appealed against within the time specified in the order, and the appeal shall lie with the Director General of Forests and Special Secretary, Ministry of Environment and Forests, Government of India, whose decision on such appeal shall be final.

35. **Leave**: The 'Officer Trainee' may be governed by Leave Rules as applicable to the college

36. **Removal from the college -** The Principal may order removal of an 'Officer Trainee' from the College for gross breach of discipline, chronic indebtedness or moral turpitude.

37. Any dispute arising in contravention to any of the provisions laid down in part or whole of these Rules shall be subject to the sole arbitration of Director General of Forests and Special Secretary, Ministry of Environment and Forests, Government of India, whose decision shall be final and binding on the parties concerned.

38. Any dispute arising in contravention to any of the provisions laid down in part or whole of these Rules shall be subject to decision of the Court of Law having jurisdiction over the college.

(A K. Goyal)
Deputy Inspector General of Forests (RT)

F. NO. 3-17/99-RT (II)
21st June 2004

Annexure-IV

COURSE CONTENTS FOR FOREST RANGE OFFICERS COURSE

GENERAL BOTANY/ MATHEMATICS

GENERAL BOTANY

Theory: 20
Practicals: 20
Field Visits: 2 Days

1. Importance and objectives of teaching Botany to a forest officer, different branches of Botany. (1)

2. Classification of plant Kingdom (3)

2.1 Cryptogams

Main divisions under cryptogams–bacteria, algae, fungi, lichens, bryophyta and pteridophyta.

2.2 Phanerogams-Gymnosperms and Angiosperms

3. External Morphology (broad characters, details to be taught in practicals). **(6)**

3.1 Root characteristic; functions, form and habit;
3.2 Stem, functions, form, different types of branching, stem modifications.
3.3 Leaf structure and functions, modifications.
3.4 Flower:
- 3.4.1 Structure and terms for describing flowers
- 3.4.2 Bracts
- 3.4.3 Calyx
- 3.4.4 Corolla
- 3.4.5 Androecium and Gynoecium
- 3.4.6 Floral diagrams and floral formulae
- 3.4.7 Inflorescence
- 3.4.8 Pollination
- 3.4.9 Fertilization

3.5 Fruit Morphology
- 3.5.1 Dehiscence
- 3.5.2 Classification

4. Histology (10)

4.1 Cell structure, physical and chemical nature of protoplasm, cytoplasm, differences between plant and animal, Prokaryotic and Eukaryotic cell.
4.2 Types of cell division (basic idea).
4.3 Tissues, and their types
4.4 Tissue system of stems
4.5 Secondary growth, annual ring formation etc.

PRACTICALS: **(20)**

Modification of stem (rhizome, tuber, bulb, corn etc.)

Leaf types, shape, margin, venation, phyllotaxy, stipules and leaf modifications, Inflorescence types.

Floral Morphology–parts of flower

Types of fruits–Classification, dehiscence etc.

Types of Seeds.

Transverse Section of root, shoot with particular reference to tissue system and secondary growth.

EXCURSION / FIELD VISIT: **(2 Days)**

Field visit: General instructions regarding using flora in the field identification.

MATHEMATICS

Theory: 40

1. **Arithmetic**: **(12)**

   1.1 Approximations
   1.2 Powers and roots
   1.3 Logarithms
   1.4 Ratio and proportion
   1.5 Simple and compound interest

2. **Algebra**: **(14)**

   2.1 FactorizationStandard forms
   2.2 Equation-simple, simultaneous, quadratic
   2.3 Arithmetic progression
   2.4 Geometric progression.
   2.5 Permutations and combination
   2.6 Binomial theorem
   2.7 Trinomial theorem
   2.8 Remainder theorem

3. **Trigonometry**: **(14)**

   1.1 The ratios, relations between ratios
   1.2 Angles more than 90 degree and signs of ratios
   1.3 Use of tables
   1.4 Solutions of triangles
   1.5 Areas of triangles

APPLICATION OF MODERN TOOLS AND TECHNOLOGY

Theory: 52

Practicals: 50

PART-A : REMOTE SENSING TECHNIQUES IN FORESTRY

1. Aerial Survey: (10)

1.1 Introduction to aerial photography and photogrametry; types of aerial photos; photographic specifications for forestry applications, obtaining, handling and storage of aerial photographs, scale and horizontal measurement, tilt and displacement, stereoscopy, elements and steps involved in photointerpretation, mapping, map numbering and orthophoto maps, difference between aerial photograph and maps.

1.2 Measurement of height of an object and height difference characteristics of single tree and a stand, area determination and stock mapping, use of aerial photographs in forest inventory and forest management.

1.3 Application of Aerial Photography for estimation of timber volume and volume increment of a crop using stratified random sampling, line plot and strip sampling and multi-stage sampling methods.

2. Remote Sensing: (12)

2.1 Introduction, basic principles of remote sensing, spectral reflectance in infrared region, thermal infrared radiation and other spectral band from vegetation, soil and water.

2.2 Introduction to RBV, MSS, LISS, TM, Thermal Images, Radar Technology, SAR Interferometry for generating accurate topographic map sets.

2.3 Procurement of satellite data.

2.4 Resolution and form of data from LANDSAT, NOAA, SPOT, IRS 1 B, C and D, IKONOS High Resolution Satellite etc.

2.5 Visual Interpretation and Digital Image Processing of Satellite data.

2.6 Application of remote sensing techniques in forestry and allied subjects and future prospects of remote sensing.

2.7 Use of satellite imagery in multi-stage sampling for forest Inventory and change detection.

2.8 National vegetation mapping.

2.9 Use of Global Positioning System for collection of field data.

2.10 Methodology for ground validation.

PRACTICALS: (10)

1. Aerial Survey: Stereotest, Orientation of aerial photographs, determination of photoscales, transfer of points under stereoscopy, construction of principal points measurement of height and crown diameter of single tree, crown density of a stand, stock mapping.

2. Remote Sensing: Digital and visual interpretation of satellite imagery. Multi-stage sampling for volume estimation using satellite imagery and aerial photos.

3. Land use and Soil Capability Classification.

PART-B : COMPUTER APPLICATIONS IN FORESTRY

Theory -10

Practicals -20

1. **Introduction to Windows**
2. **Operating Systems**

   Introduction to operating Systems

3. **Word Processing:**

   Self-learning package

   MS-WORD: Edit, Save, Print, Block, Mail, Merge, Spell Checks, Thesaurus Advance features, Exercises, Practice and Quiz.

4. **Spread Sheet**:

   Introduction to Electronic Spread Sheet

   Application and creation of spreadsheets

   M.S. EXCEL: Menus, Graphs, Reports and Printing of Spread sheets Forestry Applications Practice and Quiz, Self learning package.

5. **Data Base Management Systems (DBMS)**:

   Introduction to Data Base Management
   Systems M.S. ACCESS: Creating Data Base,
   Modify, Add and delete records, Report Generation Practice and Quiz.
   Forestry Application in DBMS Self-learning package.

6. **Graphical packages and Multi Media Applications** Presentation Tools: MS-Power Point.

   Practice and Quiz

7. **Computer Viruses**
8. **Latest Trends in Computers**
9. **Computers in Wildlife Management, Making use of spreadsheets and DBMS for Census etc. Networking Concepts: LAN; WAN; INTERNET.**
10. Application of Computers in Forestry

PART-C : APPLICATION OF GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Theory-20
Practical-20

THEORY **(20)**

1. Basic Concepts in GIS
2. Scope of GIS
3. Principles of GIS
4. Concepts Spatial and Non Spatial Information
5. Preparing and developing spatial and non-spatial database for GIS Analysis
6. Methods of data entry in the GIS Domain
7. Analytical Capability of GIS
8. Applications of Forest and wildlife management and allied areas
9. Generating outputs for application in field

PRACTICALS **(20)**

1. Exposure to different sources of spatial and non- spatial data
2. Preparation of data inputs for GIS
3. Introduction to hardware and different software's available
4. Hands on training in operating basic of the GIS 5. Actual data entry of spatial and non-spatial data
6. Editing, rasterization, labeling of attributes etc.
7. Carrying out theme based analysis to know applications to forestry, wildlife and allied areas.
8. Generating outputs useful for managers of the resources

SILVICULTURE-I

Theory: 52
Practicals: 20
Excursions: 8days

PART-A : General Silviculture

1. INTRODUCTION: **(1)**

Definition, scope and basis of rational Silvicultural practice.

2. LOCALITY FACTORS: **(5)**

2.1 **Climatic factors**: Importance of climate and weather in forestry; elements of climate and factors influencing forests, periodicity of climate, climatic provinces, seasons, solar radiation, temperature, moisture and wind. **1**

2.2 **Physiographic factors**: Altitude and its effect; effect of slope and aspects; topography and surface conditions. **1**

2.3 **Edaphic factors**: soil condition; soil moisture; influence of soil on vegetation, indicator plants. **1**

2.4 **Biotic factors**: plant parasites, beneficial and injurious affects of wild and domestic animals, interference by man, beneficial and harmful effects of fire. **1**

2.5 **Interaction of locality factors** in determining vegetation, relative hardiness of species, resistance and tolerance to different climatic factors. **1**

3. SITE MAINTENANCE AND IMPROVEMENT: (2)

3.1 Site maintenance in regeneration operations:
- 3.1.1 Evaluation of site character for plantation
- 3.1.2 Structural management of soils
- 3.1.3 Water Management
- 3.1.4 Soil working in relation to moisture conservation
- 3.1.5 Cultural practices

3.2 Site maintenance in forest stand:
- 3.2.1 Species composition
- 3.2.2 Control grazing
- 3.2.3 Manures and fertilizers
- 3.2.4 Soil amendment
- 3.2.5 Fertility potential of soil

4. GROWTH AND DEVELOPMENT OF TREE: **(8)**

4.1 **Tree form**: Form of crown, branching, bole and root, root and mycorrhiza-their types and role. **1**

4.2 **Structure** **1**
- 4.2.1 Stem structure-bark
- 4.2.2 Root structure

4.3 **Water relations** **1**
- 4.3.1 Ascent of sap
- 4.3.2 conduction
- 4.3.3 Transpiration
- 4.3.4 Moisture availability and growth

4.4 **Light relations** **1**
- 4.4.1 Photosynthesis
- 4.4.2 Photoperiod
- 4.4.3 Leaves and light relations
- 4.4.4 Ground flora and light
- 4.4.5 Light demanders and shade bearers
- 4.4.6 Other effects of light

4.5 **Food relations** **2**
- 4.5.1 Carbohydrate metabolism
- 4.5.2 Assimilation
- 4.5.3 Respiration

4.5.4 Nitrogen assimilation.
4.5.5 Major and minor nutrients
4.5.6 Function of mineral nutrients
4.5.7 Mineral deficiency
4.5.8 Translocation
4.5.9 Accumulation
4.5.10 Parasitism

4.6 **Growth regulations** **1**
4.6.1 Absorption and translocations
4.6.2 Growth promoters
4.6.3 Growth inhibitors and phytocides
4.6.4 Other important effects of growth regulators

4.7 **Growth and development**-Period of growth and rest, growth rings, height growth, diameter growth, volume increment, quality increment, Growth in Bamboos. **1**

4.8 **Crop Morphology:**
Differentiation of stands by composition and density crown and canopy, crown classification, crown closure, root competition. **1**

5. CLASSIFICATION OF FOREST TYPES AND THEIR DISTRIBUTION: (4)

5.1 Basis for classification.
5.2 Forest types of India and their distribution according to Champion and Seth's classification.

Note: Field study of tree growth and development, study of locality factors, forest stand, succession, study of vegetation in various forest types shall be done during field tours and excursions.

(5 days)

PART-B : SILVICULTURAL PRACTICES

1. NATURAL REGENERATION (3)

1.1 Natural regeneration by seed
1.2 Natural regeneration by coppice
1.3 Natural regeneration by root suckers
1.4 Cultural operations

2. ARTIFICIAL REGENERATION (21)

2.1 **General Consideration** **3**
2.1.1 Objects of artificial regeneration; artificial v/s natural regeneration
2.1.2 Choice of species in respect of hard-woods, softwoods, fast growing, slow growing, exotics and indigenous species.
2.1.3 Sowing v/s planting
2.1.4 Pure v/s mixed crops

2.2 **Seed Supply** **3**
2.2.1 Seed collection, selection of plus trees, their evaluation.

2.2.2 Seed orchard, seed stand, seed production areas, seedling seed orchards and clonal seed orchards.
2.2.3 Seed testing, certification and storage
2.2.4 Pre-sowing treatment of seed including stratification and scarification.

2.3 **Nursery** **3**
2.3.1 Selection of site, Layout, preparation beds, fencing
2.3.2 Seed requirement; Time and method of Sowing.
2.3.3 Protection of seed and seedlings against diseases, pests and natural calamities.
2.3.4 Green and organic manure and fertilizer application, shading, watering and damping off; weed control in the nursery.
2.3.5 Weeding and hoeing; Thinning out, culling shifting grading of seedlings, time and method of transplanting, maintenance of fertility, calendar of operations.

2.4 Container plants **2**
2.4.1 Specification of container
2.4.2 Potting Media
2.4.3 Container Filling and stacking
2.4.4 Time and method of sowing and transplanting

2.5 Modern Nursery Techniques **3**
2.5.1 Comparative performance of planting stock raised from vegetative parts and from seed.
2.5.2 Clonal Techniques
2.5.3 Root suckers
2.5.4 Root and rhizome cutting
2.5.5 Layering
2.5.6 Grafting
2.5.7 Budding
2.5.8 Hormone and stimulants for rooting
2.5.9 Green house and mist chamber design and management

2.6 Planting Operations and Techniques **4**
2.6.1 Survey and mapping of the plantation area, treatment map, clearing, burning, planting plan, direct sowing
2.6.2 Season of planting
2.6.3 Stacking and Carriage to planting site
2.6.4 Spacing
2.6.5 Size of trench and pits, and soil working
2.6.6 Method of planting of nursery bed and container grown seedlings
2.6.7 Irrigation including water conservation techniques and drainage
2.6.8 Application of fertilizers
2.6.9 Use of fungicides and insecticides
2.6.10 Nurse and cover crop

2.7 Maintenance of plantation **2**
2.7.1 Weeding

2.7.2 Soil working and hoeing
2.7.3 Watering
2.7.4 Mulching
2.7.5 Protection from grazing
2.7.6 Replacement of causalities, cutting back

2.8 **Plantation Records** **1**
2.8.1 Site Map and Site Photographs
2.8.2 Treatment Map
2.8.3 Plantation Estimations
2.8.4 Records of various operations
2.8.5 Expenditure incurred.
2.8.6 Monitoring and Evaluation Formats, Inspection Notes etc.

3. TENDING **(4)**

3.1 **Definition**

3.2 **Weeding and cleaning**
3.2.1 Weed control in natural regeneration areas
3.2.2 Weed control in artificial regeneration areas
3.2.3 Climber control
3.2.4 Cleaning

3.3 Thinning in plantations
3.4 Thinning in natural regeneration areas
3.5 Thinning in irregular crops
3.6 Thinning intensity and mathematical checks
3.7 Pruning

4. GENETICS AND TREE IMPROVEMENT **(4)**

4.1 Mendalian law of heredity
4.2 Provenance delimitations and trials
4.3 Hybridisation, plant breeding including selective breeding and progeny trials
4.4 Biotechnology and tissue culture.

5. Seed Orchard Establishment

6. Seed collection from superior trees, handling, storage

PRACTICALS: **(20)**

1. Seed Processing **2**
1.1 Extraction
1.2 Cleaning

2. Seed Testing **5**
2.1 Sampling
2.2 Moisture determination
2.3 Purity analysis
2.4 Germination test

2.4.1 First day: Seed counting, preparation of seed beds/ petri dishes, putting the seed for test
2.4.2 Fifth day Counting
2.4.3. Fifteenth day: final counting
2.5 Viability test
2.5.1 Day one: Counting of seeds, soaking in water and preparation of reagent.
2.5.2 Day two: De-coating of seed and putting seeds in test solution
2.5.3 Day three: Evaluation

3. Rooting of cuttings **3**
3.1 Taking of cuttings and planting in beds
3.2 Evaluation after a week and writing report

4. Budding, Grafting and Layering **3**

5. Other Methods of Propagation **3**
5.1 Bamboo Propagation
5.2 Evaluation of result and reporting

6. Plus Tree Selection **4**
6.1 Selection of phenotypically superior quality trees, marking and reporting
6.2 Finalization of trees and its marking
6.3 Recording of data and maintenance of records
6.4 Collection of reproductive material, its transportation and establishment of germplasm

FIELD EXERCISE: **3 Days**

(i) Preparation of a plantation scheme for a given area including estimates and scheduling various operations and protection of the plantation for five years. (This could be done during Watershed Management Plan exercise).

(ii) Visits to nursery and plantation sites to study and participate in the operations.

Note: The above experiments are to be carried out under the guidance of Scientists from Seed Testing Laboratory, Plant Physiology and Genetics branches of the Research Institute of I.C.F.R.E.

SILVICULTURE II

Theory Lectures: 38
Field Exercises: 2 Days

PART-A: Silviculture of Indian trees

1. General description dealing with the general value, growth characteristics, natural distribution, phenology, silvicultural characters, autecology, synecology, community environment, natural regeneration, artificial regeneration, seed collection, storage, nursery technology, plantation technology, after care, tending operations and management of following species:
   - 1.1 **Common species:** **(12)**
     - 1.1.1 *Cedrus deodara*
     - 1.1.2 *Pinus roxburghii*
   - 1.2 **Broad leaved:**
     - 1.2.1 *Acacia nilotica & A. catechu*
     - 1.2.2 *Azadirachta indica*
     - 1.2.3 *Dalbergia sissoo*
     - 1.2.4 *Eucalyptus species*
     - 1.2.5 *Madhuca indica*
     - 1.2.6 *Shorea robusta*
     - 1.2.7 *Tectona grandis*
     - 1.2.8 *Terminalia species*
     - 1.2.9 *Populus species*
     - 1.2.10 *Casuarina equisetifolia*
   - 1.3 **Bamboos and Rattans:**
     - 1.3.1 *Bambusa species*
     - 1.3.2 *Calamus species*
     - 1.3.3 *Dendrocalamus strictus & other Dendrocalamus species.*
     - 1.3.4 *Malocana bambusoides.*
2. **Species of regional importance**: **(8)**
   - 2.1 **Northern region:**
     Celtis australis
     Diospyros species
     Grewia species
     Picea smithiana
     Pinus wallichiana Populus spp.
     Quercus species
     Robinia pseudoacacia
     Salix species
   - 2.2 **Southern region:**
     Anacardium occidentale,
     Acacia spp. *(wattles),*
     Casuarina spp.,

Dalbergia latifolia
Dipterocarpus spp.
Pongamia species.
Pterocarpus spp.
Santalum album
Swietenia mahogany
Tamarindus indica.

2.3 **Eastern region**:
Anthocephalus kadamba
Chuckrassia tabularis
Cryptomeria japonica
Dipterocarpus species
Mesua ferea
Morus laeviegata
Pinus kesiya
Shorea assamica
Terminalia myriacarpa

Note: This subject should also be covered during study tour and species of regional importance will be taught to groups of that region.

PART-B : Silvicultural Systems

1. **Introduction**: **(1)**

Definition, scope and classification, formulation and objectives of systems.

2. Clearfelling systems and its modifications, cutting sections- application in India. **(1)**

3. **Shelter wood system:** **(6)**
   - 3.1 Uniform system- including regeneration period, periodic blocks, their types and importance, regeneration fellings, examples and application in India, Chir, Deodar, Kail, Sal, Teak.
   - 3.2 Group system
   - 3.3 Irregular shelterwood system
   - 3.4 Canopy lifting shelterwood system

4. **Selection system:** **(4)**

Characteristics, rotation, felling cycle, application in India.

5. **Coppice system;** **(2)**
   - 5.1 Simple coppice system
   - 5.2 Coppice with standards–rotation, selection of standards, yield
   - 5.3 Coppice with reserve 5.4Pollard system

6. **Conversion:** **(1)**
   - 6.1 Reasons for conversion and types of conversion
   - 6.2 Conversion from uniform to selection

6.3 Conversion from coppice system to high forest

7. Concept of Dauerwald and Method du controlle (1)

8. New concepts in Silvicultural systems keeping in view the new trends in ecological perspectives and management at landscape levels keeping in view the changing scenario from specific focus on utilizational aspects to conservation. **(2)**

Note: Different Silvicultural systems followed for important Indian tree species like sal, Teak, Shisham, Chir, Deodar, Fir, Spruce, Oaks etc, shall be studied during field visit. **(2 days)**

FOREST RESOURCE ASSESSMENT

Theory: 38
Practicals: 12
Field Exercise: 16days

PART-A : TREE MEASUREMENTS

1. **Diameter and girth measurement: (1)**
   - 1.1 Objects of tree measurements
   - 1.2 Reference and other points of diameter measurement of standing trees
   - 1.3 Measurements of forked, buttressed, fluted and abnormal trees
   - 1.4 Simple instruments such as caliper, tape etc. their use and relative accuracy
   - 1.5 Various kinds of dendrometres such as Bar and strut pedometer and Tele relascope, their use and relative accuracy
   - 1.6 Determination of basal area of trees and its uses
   - 1.7 Various formulae used for basal area

2. **Height measurement: (2)**
   - 2.1 Objects of height measurements
   - 2.2 Definition and measurements of various heights such as total, clear, merchantable bole etc.
   - 2.3 Principal of Hypsometers, Principles and use of Abney's level, Altimeters, relascopes and Clinometers.
   - 2.4 Relative accuracy of these instruments and sources of error in measurements.

3. **Crown measurements (1)**
   - 3.1 Objects of crown measurements.
   - 3.2 Measurements of crown width, crown height, crown area, crown volume etc.
   - 3.3 Construction and use of instruments for crown measurements such as Mirror type, Pun-Chun crown meter etc.
   - 3.4 Measurement of branch angle, branch diameter and its length.

4. **Volume measurements of logs and felled trees**: **(3)**
   - 4.1 Estimation of volume of log through sectional area, length etc.
   - 4.2 Use of various formulae for estimating volume of log such as Huber, Smalian, Newtons etc. and their relative accuracy.
   - 4.3 Volume measurements of logs, branch wood etc., by Xylometric method.

4.4 Measurement of specific gravity of wood.
4.5 Measurement of stack wood and piling coefficient
4.6 Concept and measurement of various types of volume of a tree, standard total timber, standard branch wood, sapwood and heartwood volume etc.
4.7 Estimation of conversion losses of plywood, sawn logs, poles, pulp etc. from a tree or log.
4.8 Determination of cull and assessment of internal defects on felled trees.
4.9 FRI procedure for measurement of volume of felled trees.

5. **Bark thickness measurement:** **(1)**
5.1 Need for measurement.
5.2 Instruments for measuring bark thickness, their use and accuracy.
5.3 Bark percent tables, their construction and use.
5.4 Bark quotient and conversion of (over bark) volume to (under bark) volume.

6. **Study of tree form:** **(1)**
6.1 Various theories relating to development of tree taper
6.2 Definition, measurement and use of form factors and form quotients
6.3 Various formulae relating to form of trees and their use
6.4 Taper table, taper curves and their use

7. **Volume estimation of standing trees:** **(3)**
7.1 Volume estimation by measuring diameter, height and form of trees
7.2 Definition of volume tables
7.3 Various kinds of volume tables and their uses
7.4 Construction of volume tables by graphical and regression methods
7.5 Volume estimation by volume tables

8. **Age determination of trees:** **(1)**
8.1 By ocular estimate
8.2 From records.
8.4 By counting of whorls of branches
8.5 By counting growth rings
8.6 Through successive measurements

9. **Growth measurement of trees:** **(4)**
9.1 Definition of various kinds of growth i.e. growth in diameter, basal area, height, volume, quality and their characteristics curves.
9.2 Increment percent and its determination by Pressler's and Schneider's formulae.
9.3 Determination of growth of trees with annual rings.
9.3.1 Measurement of diameter growth by stump analysis and increment borer.
9.3.2 Measurement of diameter, height and volume growth by stem analysis.
9.4 Measurement of growth for trees without annual rings from data of sample plots, linear increment plots etc.
9.5 Concept of mean and current annual increments and their relationship.
9.6 Factors influencing the volume of trees such as site, competition, age etc.

FIELD PRACTICALS **(12)**

1. Measurement of diameter girth, height, crown of standing trees and presentation of data in tabular form. **6**
2. Use of tele-relescope for calculation of taper-data and also to calculate the volume of standing trees. **6**

FIELD EXERCISE **(10)**

1. Stem and stump analysis to study the growth history of individual trees.
2. Increment boring analysis.
3. Preparation of local volume tables.

PART-B: FOREST BIOMETRY

1. **Basic statistical methods:** **(8)**
   - 1.1 Importance of statistics in forestry
   - 1.2 Grouping and presentation of data
   - 1.3 Frequency distribution and its representation
   - 1.4 Measures of central tendency–arithmetic mean, median and mode.
   - 1.5 Measures of dispersion–standard deviation, variance and coefficient of variation
   - 1.6 Normal distribution and its applications in forestry
     - 1.6.1 Properties of normal distribution
     - 1.6.2 Distribution of error
     - 1.6.3 Confidence limits
     - 1.6.4 Types of abnormality–skewness and kurtosis
   - 1.7 Expected value of mean and standard error
   - 1.8 Tests of significance
   - 1.9 Correlation and regression
     - 1.9.1 Definitions
     - 1.9.2 Simple linear regression and its fitting by least square method
     - 1.9.3 Coefficient of determination and its significance
     - 1.9.4 Examples of multiple regression

2. Forest Sampling: **(6)**

- 2.1 Necessity of sampling in forestry
- 2.2 Complete enumeration v/s partial enumeration 2.3Principal steps in sample surveys
- 2.4 Terminology and concepts:
  - 2.2.1 Population, sampling unit and frame
  - 2.2.2 Size of sample/sampling intensity
  - 2.2.3 Bias, accuracy and precision
  - 2.2.4 Sampling variation and estimation of sampling error
  - 2.2.5 Determination of sample size at a given level
  - 2.2.6 Classical sampling design used in forest surveys
- 2.5 Simple random sampling
- 2.6 Stratified random sampling

2.7 Systematic sampling
2.8 Point sampling and use of wedge prism and relascope
2.9 Examples of National Forest Inventory design of India and other countries
2.10 Continuous forest inventory

3 Crop Measurements: (7)

3.1 Lay out of sample plots
- 3.1.1 Objective
- 3.1.2 Various kinds of sample plots–temporary, permanent, linear increment etc.
- 3.1.3 Considerations while laying out sample plots number, location, size and shape
- 3.1.4 Frequency and timing of measurements

3.2 Definition and measurement of crop diameter, crop height, top height, and crop age
3.3 Methods of volume estimation of crop
- 3.3.1 Arithmetic mean tree method
- 3.3.2 One inch diameter class or Hossfeld's method
- 3.3.3 Huber's, Urich'sHartigs method and Blocks method
- 3.3.4 F.R.I. procedure
- 3.3.5 Graphic method
- 3.3.6 Abstract sample tree methods–by volume table, volume-curve and Prussian Institute methods

3.4 Growth and yield estimation of stand:
- 3.4.1 Concept of growth of stand in even aged and uneven aged forests.
- 3.4.2 Factors affecting the growth of stands–site quality, stand density and age
- 3.4.3 Methods of site classification
- 3.4.4 Determination of stand density
- 3.4.5 Preparation of yield tables by graphical and regression methods
- 3.4.6 Mathematical models for predicting growth and yield
- 3.4.7 Definition, use and projection and stand tables
- 3.4.8 Money yield tables and their uses

FIELD EXCURSIONS/ EXERCISE (6)

1. Formulation of a sampling design and carrying out the inventory in the field (Use of Computer for processing and analysis of data).
2. Calculation of basal area by the use of Wedge prism and relascope and comparing it with the data obtained through actual enumeration of standing crop.
3. Sample plot exercise–volume calculation and selection of mean tree.
4. Regression equation co-relating volume as a function of diameter and height and its use in local volume table.

FOREST SURVEY

Theory: 40
Practicals: 30

1. **Objects and scope**: **(2)**
   - 1.1 Introduction–definition, plane and geodetic survey; cadastral, Topographical, geographical, city, route and engineering surveys-Field and office work.
   - 1.2 Principles of surveying
   - 1.3 Error in surveying–cumulative and compensating errors and mistakes.
   - 1.4 Scope of surveying in forestry

2. **Scales:** **(2)**
   - 2.1 Definition, representative fraction
   - 2.2 Construction of scales, requirements of good scale, Simple Diagonal, Vernier and Comparative scales
   - 2.3 Choice of scales and scales generally adopted

3. **Measurement of Distances:** **(2)**
   - 3.1 Linear measurements, ranging of chain and lines, testing and adjustment of chains, chaining the line on flat ground, chaining on sloping ground and hypotensal allowance, sources of error in ordinary chaining and measures to minimize them, correction of distances and areas measured with incorrect chains.
   - 3.2 Chaining round obstacles

4. **Chain Surveying:** **(4)**
   - 4.1 Principles suitability, surveys with straight and irregular boundaries.
   - 4.2 Field work; reconnaissance, selection of stations and well conditioned triangles, marking of stations, the base line, tie line, check line and offsets, running a survey line and accuracy of offsets, oblique offsets and offsets to different kinds of objects such as buildings, fences, river margins etc.
   - 4.3 The field book; single and double line systems methods of recording.
   - 4.4 Method of plotting

5. Measurement of angle: **(4)**
   - 5.1 Objects, triangulation
   - 5.2 Instruments, prismatic compass, construction, use, testing, source of error and corrections, introduction to Theodolite.
   - 5.3 Magnetic bearings, Forward and Back-bearings and their relationship, whole circle bearings and reduced bearings and their relationship.
   - 5.4 The Meridian–True, Magnetic, Grid and Arbitrary meridians, the magnetic declination and its variationsIsogonic and Agonic lines.
   - 5.5 Dip. of the Needle and Iso clinic lines
   - 5.6 Local Attraction–Causes and correction.

6. **Chain and Compass surveying:** **(7)**
   - 6.1 Methods of surveying, Radiation, intersection and traversing, the closed and open traverse, comparison with chain survey, applicability

6.2 Sources of error and measures to minimize them
6.3 Methods of checking closed and open traverse data, interior and exterior angles, latitudes and departures, northings and southings.
6.4 Methods of plotting–parallel Meridian.
6.5 Closing Error, its distribution graphically and by computation
6.6 Field problems–to find horizontal distance to an inaccessible point, supplying omission of one side of a closed traverse
6.7 Laying out a coupe, its demarcation

7. Plane Table survey: (6)

7.1 Instruments–Plane Table, Alidade, Declinator, Plumbing fork and Plum-bob.
7.2 Centering and orientation.
7.3 Methods of plane tabling–radiation, Intersection, traversing and resection.
7.4 Three-point problem and its solution–Mechanical trail and error and the Bessels's graphical solution–The two point problem and its solution.
7.5 Sources of error in plane Tabling
7.6 Advantages and disadvantages of plane Tabling, applicability.

8. **Leveling: (6)**

8.1 Introduction, definitions and scope, the level surface, horizontal and vertical planes, Datum surface, and Reduced levels.
8.2 Instruments – Abney, Ceylon Ghat Tracer and leveling instruments, construction and use of Dumpy Level, Modern tilting level, temporary adjustments of the Dumpy Level only–leveling staff- Boning rods.
8.3 Difference of levels–Back sight, intermediate sight, fore sight, Height of instrument and change point, Axis of the telescope and line of Collimation–Negative readings.
8.4 Bench-Marks-GTS, permanent, temporary and arbitrary
8.5 Reduction of levels-Rise and fall system and the collimation or H.I. system, their relative merits; arithmetical checks; the level book.
8.6 Effect of Earth's curvature and refraction correction due to their combined effects.
8.7 Classification of leveling, simple leveling, compound or differential leveling, profile leveling, Crosssectioning-Reciprocal leveling.
8.8 Sources of errors and precautions

9. **Topographical Surveying and Map Reading: (7)**

9.1 Methods of contouring–direct and indirect, by interpolation, indirect contouring by radiant lines, spot height and grids.
9.2 Characteristics of contours
9.3 Uses of contours
9.4 Map Catalogue–How to obtain maps
9.5 Map reading; orientation of a map, methods of finding true north, finding one's position on the map.
9.6 Relief and its representation, hachures, hill shading spot heights, contours and form lines-layer tints.

9.7 Computation of areas by planimeter, graph, division of area into graph, division of area into triangles, squares, and trapeziums.

PRACTICALS: **(30)**

1. **Chain Survey of an area; Fieldwork plotting and finishing** **5**
2. **Chain and compass survey.** **5**
   - 2.1 Intersection
   - 2.2 Traversing
   - 2.3 Plotting and distribution of error
   - 2.4 Computation of area by graph, planimeter
3. **Plane Tabling** **7**
   - 3.1 Surveying and finishing
   - 3.2 Two and three point problems
4. **Levelling** **5**
   - 4.1 Simple leveling and booking
   - 4.2 Survey and Lay out of Terraces.
5. **Topographical Survey and Map Reading** **8**
   - 5.1 Map Reading
   - 5.2 Topographic Survey
   - 5.3 Use of Survey and Engineering Instruments

FOREST ENGINEERING

Theory: 24
Practicals: 20
Field Exercise: 10

1. Role and importance of Forest Engineering in Forest Management **(1)**
2. Building Material: **(3)**
   - 2.1 Characteristics of stones, bricks, tile and sand for building, construction.
   - 2.2 Properties of cement and storing.
   - 2.3 Mortars:
     - 2.3.1 Definition, kinds, proportions, mixing, laying and curing.
     - 2.3.2 Quantities needed for masonary work and brickwork.
   - 2.4 Concrete:
     - 2.4.1 Definition, proportion, mixing, laying and curing of concrete.
     - 2.4.2 Water cement ratio and consistency.
     - 2.4.3 Quantities of ingredients needed for different proportions of concrete.
   - 2.5 Reinforced cement concrete (R.C.C.)
     - 2.5.1 Definition, principle and advantages.
     - 2.5.2 Location of reinforcement in RCC: slabs, beams and pillars/columns.
3. **Construction:** **(8)**
   - 3.1 Considerations for selection of sites.

3.2 Drawing and layout
3.3 Foundation:
- 3.3.1 Safe bearing capacity of soil
- 3.3.2 Footing
- 3.3.3 Width of foundation, depth of foundation by Rankine Rule and thickness of concrete bed.
- 3.3.4 Damp proof courses
- 3.3.5 Precaution against termite

3.4 Super structure:
- 3.4.1 Scaffoldings
- 3.4.2 Thickness of walls
- 3.4.3 Bonds in brick work-Kinds, difference between English and Flemish bonds, details of English bond at corners, junctions and inter-section of 1 brick and 1 ½ brick walls
- 3.4.4 Construction of different kinds of masonry walls; Ashlar, Ashlar faced, Random and coursed rubble and dry rubble masonry and dry stone revetments
- 3.4.5 Method of constructing mud, brick and stone masonary, CGI and wooden walls.
- 3.4.6 Stone versus bricks

3.5 Sills and Lintels:
- 3.5.1 Kinds of sills and their construction
- 3.5.2 Lintels and their constructions
- 3.5.3 Position of reinforcement in RCC lintels

3.6 Roofs: Types–Sloping and Flat roofs
3.7 Types of Roof covering
3.8 Floors:
- 3.8.1 Trench and basement fillings
- 3.8.2 Stone, concrete and wooden floor

3.9 Doors and windows
- 3.9.1 Doors, types and sizes normally used, lodged and braced, battened doors, paneled, glazed and wire- gauge; doors, swing doors.
- 3.9.2 Windows–fanlight, ventilator and clerestory window.

3.10 House drainage and sewage: Sanitary fittings and plumbings-washbasin, sinks-bathtubs-water closets-traps-flushing cisterns-inspection chamber-septic tank- dispersion trenches.
3.11 Electrical Fittings

4. **Roads:** **(4)**

4.1 Introduction
- 4.1.1 Necessity of roads
- 4.1.2 Classification
- 4.1.3 Cross and longitudinal section
- 4.1.4 Systems of metalling

4.2 Design
- 4.2.1 Road and land widths
- 4.2.2 The shoulders

4.2.3 Camber
4.2.4 Gradients
4.2.5 Section on hill road
4.2.6 Drainage of plain and hill roads
4.2.7 Road curves, super-elevation widening and Sighting distance.

4.3 Alignment:
4.3.1 Reconnaissance
4.3.2 Obligatory point
4.3.3 Alignment of a plain road
4.3.4 Alignment of a hill road
4.3.5 Preliminary survey
4.3.6 Paper location

4.4 Demarcation
4.4.1 Retaining wall and breast walls
4.4.2 Necessity; material used; forces acting
4.4.3 Conditions of stability and thumb Rules for design of brickwork.

5. **Bridges:** **(2)**

Introduction to various types of forest bridges, Irish bridge, causeway, road siphon, culvert, timber bridge, cantilever bridge and their construction.

6. **Conservation Engineering** **(3)**

6.1 Structural stability and Construction of:
6.1.1 Check dam and its components-head wall-apron, wingwall, spillway, embankment, and Gabion's structure.
6.1.2 Spurs, revetments, jetties, etc.
6.1.3 Embankment (masonry, earthen and Gabion's)

6.2 Ecological considerations in designing engineering structures, landscaping etc.

7. **Estimating and costing** **(3)**

7.1 Study of drawings for estimation – plan, sections Elevations of small buildings, road sections, slab or pipe culvert, stream training structures etc.
7.2 Principles and essential parts
7.3 Project report
7.4 Specifications
7.5 Units of measurements
7.6 Procedure and proforma of detailed measurements and bill of quantities for building, roads, culverts, stream training structures etc.
7.7 Working out quantities for simple building, roads culverts, stream training structures etc.
7.8 Analysis of rates/SSR (Standard Schedule of Rates)
7.9 Abstract of cost estimates
7.10 Plinth area and cube rate estimates
7.11 Measurement Book

PRACTICALS (Drawing and exercise): (20)

1. Location of reinforcement in RCC, lintels, slab and columns. **2**
2. Earth work, sections, slope, template calculation of volume by trapezoidal, prismoidal Rules. **2**
3. Foundation of building, standard foundation and designs by Rankine's formula **3**
4. Study of different drawings of buildings, roads, culvert stream training structures for preparation of estimates. **3**
5. Preparation of estimate of building, road, culvert, and stream training structures. **8**
6. Calculation of earthwork for buildings and roads **2**

FIELD EXERCISE: (10 days)

1. Road alignment exercise including setting out of curve estimating and reporting.
2. Survey of a nala for construction of soil conservation structures, designing, estimating and reporting.

ADVERSE INFLUENCE ON FORESTS

Theory: 30
Practicals: 5
Local Excursions: 3 Days

1. Susceptibility of forest to damages caused by different agencies. **(1)**
2. Prevention and protection measures for damages by different agencies: **(29)**
   - 2.1 **Human agency:** **3**
     - 2.1.1 Encroachment, poaching, illicit felling & removal of forest produce.
     - 2.1.2 Faulty land use practices including shifting cultivation, over grazing.
   - 2.2 **Forest fires:** **3**
     - 2.2.1 Controlled fires in forest regeneration and habitat management.
     - 2.2.2 Types of forest fires and the extent of damages caused by them;
     - 2.2.3 Preventive Control measures;
     - 2.2.4 Fire Management Planning
   - 2.3 **Natural Factors: 2**
     (i) frost; (ii) snow; (iii) hail (iv) storm (v) drought (vi) water logging (vii) floods.
   - 2.4 **Forest pests:**
     - 2.4.1 Role of insects and pests in forest eco-system**.** **1**
     - 2.4.2 Symptoms, extent and nature of damage, preventive and control measures of important insects/pests of: **5**
       - (a) Seeds
       - (b) Nurseries
       - (c) Felled and converted trees
       - (d) Standing trees (Plantation and natural forests) with special reference to: Sal, Teak, Toon, Eucalyptus, Poplar, Chir, Deodar, Bamboo and Sandalwood.

2.5 **Forest Pathogens:**

2.5.1 Introduction and importance of forest pathology **1**

2.5.2 Symptoms, extent and nature of damage, preventive and control measures of important diseases of: **5**

(a) Seed and nurseries

(b) Root diseases of sissoo and khair

(c) Stem diseases of Eucalyptus, Poplars, Sal, Khair, Teak (coppice) and Chir (stem rust). (d)Foliage diseases of Poplar, Teak

2.5.3 Spike disease of sandal wood **2**

2.5.4 Mycorrhiza: Importance in Forestry- (i) Ecto-Abies, Cedrus (ii) Endo Acacia, Prosopis, Albizia. **2**

2.6 **Protection of Plantations and Regeneration Areas** **5**

2.6.1 Fencing

2.6.1.1 Types of fencing and their effectiveness

2.6.1.2 Cost, construction and maintenance.

2.6.2 Protection through participation of local people in forestry programmes.

2.6.3 Protection against fire

2.6.3.1 Annual Fire Management Plan

2.6.3.2 Forest Fire forecasting system

2.6.3.3 Fire suppression techniques

2.6.4 Protection against weeds and climbers

2.6.5. Protection against natural calamities/atmospheric agencies

2.6.6 Grazing problems

PRACTICALS: **(5)**

1. Visit to Entomology Museum and Entomology insectory to see insect pests and their damages (at the Institutesof ICFRE). This preferably be done before theory class for better understanding of the subject.
2. Methods of insects/pests (especially rodents) control, techniques-demonstration at the Institutes of ICFRE
3. Diagnosis of insect damage of common trees by symptoms in the fields.

FIELD VISITS

Local visit to forests to acquaint the Officer Trainees with diseases of common trees, their preventive and control measures **(3 days)**

FOREST UTILIZATION – I

Lectures: 37
Practicals: 10
Field visits: 5

1. **Wood Harvesting:** **(7)**
   - 1.1 Basic logging hand tools and their maintenance **2**
     - 1.1.1 Power chain saw and attachments.
     - 1.1.2 Felling of trees
     - 1.1.3 Cross cutting, delimbing etc.
   - 1.2 Off road transportation **2**
     - 1.2.1 Ground skidding
     - 1.2.2 Use of Tractor
     - 1.2.3 Dragging
     - 1.2.4 Winches
     - 1.2.5 Aerial transport
   - 1.3 Major transportation **1**
     - 1.3.1 Loading devices
     - 1.3.2 Surface transportation
     - 1.3.3 Water transportation.
   - 1.4 Logging planning **1**
   - 1.5 Timber Depot Management **1**

2. **Wood Technology** **(15)**
   - 2.1 Gross features of wood **2**
     - 2.1.1 Pith, heartwood, sap wood
     - 2.1.2 Bark, early wood, late wood, growth rings
   - 2.2 Minute structure of wood **2**
     - 2.2.1 Tracheids, fibres and vessels
     - 2.2.2 Parenchyma, rays and resin canals
   - 2.3 General properties:Colour, fluorescence, lusture, odour, weight, hardness, grain, texture and figure. **2**
   - 2.4 Identification of timber with key **1**
   - 2.5 Properties of wood, defects and abnormalities **2**
     - 2.5.1 Physical properties of wood
     - 2.5.2 Mechanical properties of wood
     - 2.5.3 Factors influencing strength properties of wood
     - 2.5.4 Suitability indices and their use
     - 2.5.5 Safe working stresses and their valuation.
     - 2.5.6 Testing and evaluation of timber products.
     - 2.5.7 Classification of defects in wood and their influence on utilization characteristics.
     - 2.5.8 Measurement and evaluation of defects.

2.6 Wood seasoning **3**
- 2.6.1 Introduction
- 2.6.2 Object, need and importance of seasoning
- 2.6.3 Air seasoning
- 2.6.4 Kiln seasoning
- 2.6.5 Special methods of seasoning
- 2.6.6 Schedules and classification of timber
- 2.6.7 Design of seasoning kilns
- 2.6.8 Air-drying sheds and solar kiln

2.7 Wood Preservation **3**
- 2.7.1 Need of wood preservation.
- 2.7.2. Natural durability of timber and wood destroying agencies
- 2.7.3 Types of wood preservatives, their characteristics, composition and properties.
- 2.7.4 Preparation of material for treatment
- 2.7.5 Method of wood preservation
- 2.7.6 Factors affecting penetration of preservatives
- 2.7.7 Properties of treated wood
- 2.7.8 Testing of wood preservatives and treated timber
- 2.7.9 Treatment of timber for different uses including cost aspects.

3. **Wood Based Industries** **(5)**
- 3.1 A panoramic view of the forest based industries in India.
- 3.2 Demand and supply position of raw material for wood based industries.
- 3.3 Indian tree species whose timbers are suitable for different wood based industries.
  - 3.3.1 Plywood, fibre board, particle board, improved wood- specifications of raw material for suchindustries; present supply and demand situation, manufacture.
  - 3.3.2 Properties and uses of plywood, fibre board particleboard.
  - 3.3.3 Sandalwood, Katha, Aqarwood
  - 3.3.4 Wood substitution
- 3.4 Cellulose and paper Industry.
  - 3.4.1 Demand and supply situation of raw material for paper and Cellulose Industry
  - 3.4.2 Manufacture of paper (only the outline)
  - 3.4.3 Manufacture of rayon (only the outline)

4. **Saw Milling:** **(3)**
- 4.1 Types of saws, saw mill machinery
- 4.2 Design and layout of saw mills and wood workshop
- 4.3 Wood working.
- 4.4 Saw Mill Rules

5. **Grading of Timber and Timber Products** **(2)**

Commercial grading, stress grading, existing Indian standards for grading.

6. **Suitability of Indian Timber For:** **(5)**
- 6.1 Agricultural implements.
- 6.2 Furniture Industry.

6.3 Packing case
6.4 Coach building and sleeper industry
6.5 Sports goods, musical instruments.

PRACTICALS: **(10)**

1. Identification of timbers with key
2. Assessment of Yield

FIELD VISITS: **(5 Days)**

1. Paper Industry.
2. Plywood Industry.
3. Composite wood and fiber board industry.
4. Saw mill industry.
5. Timber Depot.
6. Assessment of yields for veneer, plywood and saw mills.

FOREST POLICY AND LAWS

Theory: 62
Field Exercises: 5

1. **Forest Policy:** **(4)**
   - 1.1 Necessity of a Forest policy in a country.
   - 1.2 General basis of formulation, various considerations.
   - 1.3 National Forest Policies of 1894, 1952 and 1988 their comparative study, basis of their formulation and after effects.
   - 1.4 Constraints in the implementation of Forest Policy in India. Need based law for implementation of policy.
   - 1.5 National Forestry Action Program, formulation and constraint in implementation and State Forestry Action Programs.
2. **Fundamental Principles of Laws Relating to Forests and the Indian Forest Act, 1927 (25)**
   - 2.1 Basic concepts regarding property, possession, rights and servitudes. Government property and its acquisition (salient features of Land Acquisition Act, 1894).
   - 2.2 General principles, object and reasons for enactment of special law relating to forests and its produce.
   - 2.3 Protection of Forests/Wastelands not included in a Reserved forest, Protected forests.
   - 2.4 Control over Forests and lands, not being the property of the Government.
   - 2.5 Legal protection of Forests: Demarcation, settlement of rights, prevention of offences, information and help, forest-offences in Reserved and Protected forests, grave offences, transit Rules, establishment of checking depots, Saw Mill Rules, Rules relating to protection from fire, Rules relating to hunting etc.
   - 2.6 Application of cattle Trespass Act, 1871 to forests, scope and limitations.
   - 2.7 Legal principles of punishment; the punishment, aggravation of offences, imprisonment and fine, seizure, confiscation as a punishment, properties liable to confiscation.

Distinction between confiscation and forfeiture. Disposal of forest produce in respect of which a forest-offence is committed and is the property of the Government, and the case where it is not the property of the Government. Disposal of tools, boats, vehicle and cattle used in commission of any forest offence. Procedure when offender is not known, disposal of perishable property, wrongful seizure.

2.8 Power of Forest-Officers under Indian Forest Act: Power relating to arrest (to be discussed along with the topic at 3.3) and seizure. Power to confiscate, demand aid, and prevent offences. Power to compound forest offences, scope thereof, and principles, which regulate the exercise of this power. Power of Criminal courts in relation to issue of search warrants (to be discussed along with the topic at 3.6), holding inquiry into forest–offences and receiving and recording evidences (to be discussed along with the topic at 3.9). Power of civil courts to compel the attendance of witness and production of documents etc. (to be discussed along with the topics at 4.1 to 4.4). Power to distribute rewards out of the proceeds of fines and confiscations under Indian Forest Act. Power as receivers of Government revenue.

3. **Code of Criminal Procedure, 1973 (8)**

3.1 Definitions. Position of forest- offences as per the First Schedule of the Cr.P.C. Cognizable/noncognizable and bailable/non-bailable offences. Provisions of Cr.P.C. not applicable where special procedure is prescribed by the Indian Forest Act. (Sec.4).

3.2 Constitution and powers of Criminal courts (Secs.6 to 15, 20 and 24 to 31).

3.3 Arrest of persons (Chapter V)(included in para 2.11).

3.4 Summons and warrant of arrest (Part A and B of Chapter VI)

3.5 Information to police and their power to investigate, legal validity of confessions recorded by a Forest Officer (Chapter XII with emphasis on Sec.164 read with Sec.72 (2) of the Forest Act)

3.6 Procedure for issuing search warrants (Sec.93 and Part C of Chapter VII). Form No.10 of Second Schedule (Included in Para 2.11).

3.7 Cognizance of offences by Magistrates, prosecution of public servants (Secs.190 and 197).

3.8 Complaints to Magistrates and commencement of proceedings (chapter XV and Sec. 204 to 206). Legal position of complaints made by Forest officers.

3.9 Mode of taking and recording of evidence (Sec.272 to 275 and 277) (included in para 2.11)

3.10 Classification of forest- offences according to mode by which offender is brought. Trial of warrant cases, summons cases and summary trials (chapter XIX, XX, and XXI). Limitation (Chapter XXXVI).

3.11 Appeals and Revisions (Sec. 374 to 378, 397, 399). Criminal and Civil writs (Article 226 and 227 of the constitution of India).

3.12 Bails and bonds (Sec. 436 and 437) with special reference to Sec.65 of the Indian Forest Act.

3.13 Disposal of property (Sec. 451 and 452). Relevance with regard to forest cases in view of Sec. 55 to 59 of the Indian Forest Act.

4. **Code of Civil Procedure, 1908:** **(2)**
   - 4.1 Summons and discovery (Sec. 27 to 32)
   - 4.2 Issue and service of summons (Order V)
   - 4.3 Summoning and attendance of witnesses (Order XVI)
   - 4.4 Form no.13 of summons of witnesses (Appendix B to First Schedule of CPC).

5. **Indian Penal Code, 1860:** **(4)**
   - 5.1 Abetment of forest offences (Secs. 108,109 read with Sec. 40)
   - 5.2 Offences directly connected with forests and its produce: Theft (Secs.378, 379); criminal misappropriation (Sec.403); criminal breach of trust (Secs. 405, 406); receiving stolen property etc. (Secs. 410,411,413,414); mischief (Secs. 425 to 429); criminal trespass (sec. 441); Attempt to commit offences (Sec.511).
   - 5.3 Offences indirectly connected with forest works: Unlawful assembly (Secs. 141 to 144); omitting to give aid and information, or giving false information (secs. 176,177,187,201); giving false evidence (Sec.191); concealing offenders (sec.212).
   - 5.4 Protection extended by law to Forest Officers (Secs.76, 79, and Secs. 49,43 & 74 of the Indian Forest Act).

6. **Forest (Conservation) Act, 1980:** **(4)**

   Salient features and scope.

7. Industrial Disputes Act, 1947 **(1)**

8. Wildlife (Protection Act), 1972 **(10)**

9. Environmental (Protection) Act, 1986 **(1)**

10. Eviction of Public Premises Act, 1986 **(1)**

11. Indian Evidence Act, 1872 **(2)**

EXCURSIONS:

Visit to areas prone to forest offence, preparation and collection of various documents, procedure for arrest, bails and bonds, seizure of property, inquiry and investigations, finalization of charge sheet (Challan) etc. **(5 days)**

ECOLOGY AND ENVIRONMENTAL SCIENCE

Theory: 43

Part A – Ecology

1. **Basic Concepts** **(1)**
   - 1.1 Definition
   - 1.2 Ecological principles
   - 1.3 Divisions of Ecology.

2. **Population Ecology** **(3)**
   - 2.1 Definition
   - 2.2 Structure of population

2.3 Dynamics of species population
2.4 Carrying capacity & natural regulation of population size.
2.5 Importance of population ecology in Forest Management

3. **Biotic Community** **(3)**
3.1 Concept
3.2 Ecological dominance, tolerance, aggregation
3.3 Ecotone and Edge Effect
3.4 Vegetation dynamics: Succession (recapitulation only); Palaeoecology
3.5 The plant animal interactions in a biotic community.

4. **Principles of Ecosystem Ecology** **(5)**
4.1 Introduction and basic parameters of an ecosystem
4.2 Significance of concept and types of ecosystems
4.3 Ecosystem as a unit existing in space and time
4.4 Components of Ecosystem
4.1.1 abiotic
4.1.2 biotic
4.5 Ecosystem dynamics
4.5.1 Food chains & food webs
4.5.2 Concept of trophic levels
4.5.3 Ecological pyramids
4.5.4 Concept of Habitat & Niche
4.5.5 Energy flow through an ecosystem
4.5.6 Significance of shorter food chains in meeting food/energy requirement in the context of humanpopulation explosion
4.5.7 Nutrient Cycling: concept of biogeochemical cycles- an over view
4.5.8 Concept of biomagnification & its significance
4.5.9 Concept of limiting factors.
4.6 Ecosystem productivity
4.6.1 Concept of productivity and assessment of productivity in a forest ecosystem
4.6.2 Nutrient/energy budgeting
4.6.3 Effect of forest management on energy/nutrient flow in forest ecosystem.

5. **Ecosystems of the World** **(3)**
5.1 Terrestrial Ecosystems
5.1.1 The concepts of biome & biotic regions
5.1.2 Major biotic regions of the world
5.1.3 Biotic regions of India
5.2 Major non-terrestrial ecosystems (i) Seas, (ii) Estuaries and seashores, (iii) Streams and rivers (iv) Lakes, ponds, marshes (note: brief overview only).

PART – B ENVIRONMENT CONSERVATION AND MANAGEMENT

1. **Soil and Chemical Pollution** **(2)**

2. **Air pollution** **(3)**
   - 2.1 Causes, general impacts and control.
   - 2.2 Role of Forests/Green belts in controlling pollution.
   - 2.3 Impact of air pollutants on forests and vegetation.
   - 2.4 Acid Rain
   - 2.5 Level of tolerance to pollutants of some important tree species

3. **Legal provisions and remedies** **(4)**

4. **Global Warming and Climatic Change** **(3)**

5. **Water pollution** **(4)**
   - 5.1 Major causes (including industrial and human waste wares etc), impacts and control
   - 5.2 Eutrophication and death of water bodies.
   - 5.3 Treatment and utilization of sewer water and reclamation of other industrial wastes and slid waste disposal management

6. **Thermal pollution and radiation pollution** **(1)**

7. **Noise Pollution causes, remedies and legal provisions**

8. **Tools of Environmental Management**Environmental impact assessment of development projects. **(3)**

9. **National conservation strategy and policy statement on environment & development (salient features**) **(2)**

10. **Environmental legislation in India** **(2)**

11. **Geopolitics of environment** **(4)**
    - 11.1 Environment as an emerging major foreign policy issue; the perceptions of developed and developing countries.
    - 11.2 The international conventions on environment; the Rio convention and its outcome and implication

FOREST UTILIZATION-II

Theory Lectures: 32
Practicals: 5
Field Exercise: 3

PART-I : NON-TIMBER FOREST PRODUCTS

1. **Introduction:** **(1)**
   - 1.1 Definition.
   - 1.2 Non-timber forest products of India and their importance in rural and industrial economy of the country.
   - 1.3 States of various non-timber forest products

2. **Fibres and Flosses:** **(1)**
   - 2.1 Fibre yielding plants
   - 2.2 Methods of cultivation of important fibre yielding plants

3. **Grasses, Bamboos and canes:** **(3)**
   - 3.1 Various grasses and their uses in village and cottage industries.
   - 3.2 Bamboos –their distribution, exploitation and uses, raw material scenario in bamboos.
   - 3.3 Canes-their distribution, harvesting, processing and uses.

4. **Essential Oils and their methods of extraction.** **(2)**
   Essential oil bearing plants of commercial importance, methods of their cultivation and exploitation.

5. Oilseeds **(2)**
   - 5.1 Important oil seeds obtained from forests
   - 5.2 Methods of collection, processing, packing and storage.

6. **Gums, Resin and Oleoresin:** **(2)**
   - 6.1 Commercial gums, resin, oleoresin and their economic importance.
   - 6.2 Methods of tapping of important gums, resin and oleoresin.
   - 6.3 Processing, grading, packing and storage of gums, tans and dyes.
   - 6.4 Vegetable tanning materials obtained from forests, their extraction, processing, handling and storage.
   - 6.5 Important dyes.

7. **Edible plants, nuts and spices** **(1)**

8. **Rubber:** **(1)**
   - 8.1 Cultivation, and tapping
   - 8.2 Processing
   - 8.3 Uses of rubber

9. **Charcoal:** **(1)**
   - 9.1 Various types of kiln used for manufacture of charcoal
   - 9.2 Charcoal dust briquettes

10. **Miscellaneous products**: **Determination of yield extraction, procedure, storage and marketing.** **(2)**
   - 10.1 Bidi leaves.
   - 10.2 Katha
   - 10.3 Products of destructive distillation of wood.
   - 10.4 Leaf fodder.
   - 10.5 Animal products
   - 10.6 Mahua
   - 10.7 Chironji
   - 10.8 Achar
   - 10.9 Dhak leaves
   - 10.10 Pine needles
   - 10.11 Phooljharoo

11. **Important Dyes** **(1)**

PART-II : MEDICINAL PLANTS IN INDIA

Section A

1. **Conservation of Medicinal Plants–The Current Scenario:** **(4)**
   - 1.1 Perspective, need and scope.
   - 1.2 Traditional use of Medicinal Plants (ethno Medicines)
   - 1.3 Medicinal Systems and its evolution
   - 1.4 Institutions and agencies involved
   - 1.5 National Policy on Trade, Use and Conservation of important drugs of commercial value

2. **Conservation strategy:** **(3)**
   - 2.1 In-situ and ex-situ conservation
   - 2.2 Nursery Techniques
   - 2.3 Methods of cultivation, harvesting, processing and grading
   - 2.4 Research and Training
   - 2.5 Database generating
   - 2.6 Identification, Survey/Assessment Techniques, and database generation.

Section B

(8)

Following list of medicinal plants will be dealt in the course.

1. *Saursureacostus* (Kuth)
2. Ladies Slipper Orchid (*Paphiopedilium species*)
3. Red Vanda (*Renatheraimschootiana*)
4. *Rauvolfiaserpentina* (Sarpagandha)
5. *Ceropegia species*
6. *Frereaindica* (ShindalManakundi)
7. *Podophyllum hexandrum* (emodii) (Indian podophyllum)
8. *Dioscoreadeltoidea (*Elephants foot)
9. *Pterocarpussantalinus*(Red Sanders)
10. *Taxus wallichiana*(Common Yew of Birmi leaves)
11. *Aquilariamalaccensis*(Agar wood)
12. *Aconitum species*
13. *Coptisteeta*
14. *Cosciniumfenestratum*(Columba wood)
15. *Dactyorhizahatagirea*
16. *Nardostachys grandiflora* (Jatamansi0
17. *Panax pseudoginseng*
18. *Picrorhizakurrooa*
19. *Swertiachirata* (Charayatah)
20. *Chlorophytum tuberosum* (Safed Musali)
21. Blue Vanda (Vandal cue Rulea)

Other species, which are commonly known to have valuable medicinal properties that may be dealt with in details, are as follows:

1. Anacardiumoccidentale.
2. *Argemonemexicana*
3. *Azadirachtaindica*
4. *Balanitesegyptica*
5. *Bucchananialanzan*
6. *Butea monosperma*
7. *Canabis sativa*
8. *Terminalia-arjuna*
9. *Citrus limon*
10. *Gliricidiasepium*
11. *Murrayakeonigii*
12. *Pongamiapinnata*
13. *Terminalia alata*
14. *Terminalia bellerica*
15. *Terminalia chebula*
16. *Emblicaofficinals*
17. *Mentha sps.* (mint)
18. *Ocimum sanctum* (Tulsi)
19. *Ferulaassafoetida (*Hing)
20. *Herpestismonniera*(Brahmi)
21. Cinnamomumzeylanicum (*Cinnamum)*
22. *Elettariaaromaticum (*Clove)

Practicals **(5)**

1. Field Identification
2. Surveying for Medicinal Plants
3. Cultivation and Harvesting Techniques

Field Exercises **3Days**

FOREST RESOURCE MANAGEMENT

Theory: 34
Field Exercise: 30

1. **Introduction:** **(2)**
   - 1.1 Definition and scope
   - 1.2 Management of forests and its peculiarities
   - 1.3 Forest management for environmental conservation
   - 1.4 Forest management for soil and water conservation
   - 1.5 Principles of forest management and their application.
2. **Sustained yield**: **(4)**
   - 2.1 concept and meaning of sustained yield
   - 2.2 Progressive yield
   - 2.3 Sustained yield in relation to environmental management

3. **Rotation:** **(1)**
   - 3.1 Definition
   - 3.2 Kinds of rotation
   - 3.3 Factors affecting choice of rotation
   - 3.4 Rotation and conversion period

4. **The actual growing stock and its increment**: **(3)**
   - 4.1 General considerations.
   - 4.2 Distribution of age gradations or classes in regular forests, normal and actual.
   - 4.3 Distribution of age gradations or classes in irregular forests, normal and actual.
   - 4.4 Distribution of age gradations or classes in forests under coppice systems.
   - 4.5 Growth estimation and reduction factors for:
     - 4.5.1 density
     - 4.5.2 quality
     - 4.5.3 quality and price increment.

5. **Yield regulation:** **(5)**
   - 5.1 General principles of yield calculation.
   - 5.2 Silvicultural system in relation to yield regulation.
   - 5.3 General definitions i.e. felling series, felling cycles, cutting series etc.
   - 5.4 Methods of yield regulation:
     - 5.4.1 Yield regulation in regular forests.
       - 5.4.1.1 By area, reduced area and Hufnagl's modification.
       - 5.4.1.2 By volume and increment methods.
     - 5.4.2 Yield regulation in irregular forests.
       - 5.4.2.1 Methods based on growing stock only
       - 5.4.2.2 Von Mantel's formula and its modifications
       - 5.4.2.3 Methods based on volume and increment
       - 5.4.2.4 Austrian method
       - 5.4.2.5 Method based on number of trees in various age classes and time taken to pass from one age class to the next
       - 5.4.2.6 Brandis method
       - 5.4.2.7 Hufnagl's method
       - 5.4.2.8 Smythies safeguard formula
   - 5.5 Application of different methods of yield regulations in forest management in Indian forestry.

6. **Working Plan**: **(6)**
   - 6.1 Definition, object, scope, sphere, necessity for revisions.
   - 6.2 Division of forests into various units
   - 6.3 Maps.
   - 6.4 Management Plan Code

7. **Preparation of Working Plan:** **(10)**
   - 7.1 Preliminary Working Plan report
   - 7.2 Field work

7.2.1 Stock mapping
7.2.2 Checking of maps
7.2.3. Compartment description.
7.2.4 Collection of statistical data
7.2.5 Collection of other data

8. **Office work**: **(3)**
8.1 Compilationof data
8.2 Writing of Working Plan
8.3 Control Forms
8.4 Deviation Proposals

PRACTICALS-FIELD EXERCIS **(30 days)**

Working plan exercise will be conducted in any suitable Sal or other forest covering as many types as possible. Each trainee will be required to write up a working plan for a forest block.

Rough work: breakup of working days will be as follows:

Collection of data for Part I	3 days
General examination of the working plan and field work	3 days
Fieldwork for enumeration, regeneration surveys etc.	9 days.
Mapping and compilation	15 days.

Note: The works to be done will be specified by the in charge concerned of the Working Plan Exercise.

NATURAL RESOURCE MANAGEMENT

Theory: 42
Practicals:06
Field Exercise: 26

PART-A : GEOLOGY AND SOIL SCIENCES

SECTION–A **(7)**

1. **Types of Rocks:** **2**
1.1 Igneous rock
1.1.1 Forms
1.1.2 Types
1.2 Sedimentary rock
1.3 Metamorphic rock

2. **Identification of minerals through physical characteristics** **1**

3. **Important rock-forming minerals** **2**

4. **Geological structures and their topographic expression** **2**

PRACTICALS: **(6)**

1. **Identification of Minerals**
   - 1.1 Physical characters of minerals
   - 1.2 Important rock forming minerals
2. **Identification of Rocks**
   - 2.1 Igneous rocks
   - 2.2 Sedimentary rocks
   - 2.3 Metamorphic rocks

SECTION-B **(12)**

1. **Introduction:** **1**

   Importance of soil as a factor of plant environment, soil in relation to forestry, soil as a natural living body.

2. **Soil forming processes** **1**

3. **Soil Profile**: **3**
   - 3.1 Definition
   - 3.2 Various horizons, their characteristics and differentiation in various soil types.
   - 3.3 Development of soil profiles under different conditions of climates, topography and vegetation.
   - 3.4 General features of forest soil profiles and their comparison with agricultural soils.
   - 3.5 Special features of various types of pans e.g. hard lateritic, clay, kankar etc.

4. **Physical properties:** **2**
   - 4.1 Soil texture
   - 4.2 Soil structure
   - 4.3 Other properties
   - 4.4 Soil moisture and soil water relations
   - 4.5 Soil air and temperature.

5 **Chemical properties:** **1**
   - 5.1 Organic matter
   - 5.2 Silica sesquioxide ratios
   - 5.3 Soil colloids
   - 5.4 Soil pH
   - 5.5 Nutrient elements
   - 5.6 Soil Nitrogen.

6. **Biological properties:** **1**
   - 6.1 Soil microbiology
   - 6.2 Soil fauna

7. **Major Soil Groups:** **1**
   - 7.1 Soil classification
   - 7.2 Soil survey and soil mapping
   - 7.3 Rock, Soil-Plant relationship
   - 7.4 Soil properties influencing forest growth **2**

FIELD EXERCISE: (6 Days)

1. Study of soil profile and recording of relevant field data on soil and vegetation etc.
2. Determination of physical properties of soil in the field such as structure, texture, hardness, porosity, colour, pH etc. and study of vegetation growth in relation to such physical properties of soil.
3. Writing of a soil survey report and analysing the data for selection of species and further treatment of the soil, if needed.

PART-B : LAND USES & WATERSHED MANAGEMENT

1. **Land use problems in India**: **(2)**
   - 1.1 Agrarian customs, agriculture practices.
   - 1.2 Social customs with reference to use of various resources.
   - 1.3 Erosion:
     - 1.3.1 Principles
     - 1.3.2 Types of erosion
     - 1.3.3 Agencies of erosion
     - 1.3.4 Kinds and forms of erosion, degree of erosion
     - 1.3.5 Causes and effects of erosion
2. **Waste land Management:** **(2)**
   - 2.1 Introduction
   - 2.2 Classification
   - 2.3 Identification and Reclamation of saline-alkali soil
   - 2.4 Management of water logged areas
   - 2.5 Identification of various types of waste lands.
   - 2.6 Development of such wastelands and techniques adopted.
3. **Range Management:** **(6)**
   - 3.1 Grass land-types and their distribution in India.
   - 3.2 Principles of grassland management and various measures for maintaining grassland in good condition, (silvipastoral techniques) closures, soil and water conservation measures, application of fertilizers, seeding and planting of improved grasses, weed control and control burning, other operations like silage, hay making, stall feeding, storage of grass, provision of facilities in pastures for even distribution of grazing pressure.
4. **Hydrological cycle**: **(2)**
   - 4.1 Hydrological cycle and its importance
   - 4.2 Rainfall, its measurement, intensity, duration and frequency
   - 4.3 Infiltration, percolation
   - 4.4 Evaporation and transpiration
   - 4.5 Run-off, peak rate of run off; methods for calculations, Rational and Cook's method.

5. **Soil and water conservation measures**: **(5)**
   - 5.1 Contour cultivation, contour trenching design and lay out
   - 5.2 Bunding and terracing
   - 5.3 Erosion control and water conservation structures like spill ways, their types, design, construction and maintenance.
   - 5.4 Gully control, principles of planning, safety of works; use, design and maintenance of check dams
   - 5.5 Stream bank erosion control
   - 5.6 Torrent control, control measures in catchment and in channel
   - 5.7 Landslide control
   - 5.8 Control of erosion on highways and railways
   - 5.9 Wind erosion control, wind breaks shelterbelts, sand dune fixation
   - 5.10 Water harvesting–Water absorption trenches and check dams

6. **Watershed Management Plan**: **(6)**
   - 6.1 Unit of planning
   - 6.2 Codification of watersheds-watershed, sub-watershed, micro-catchment
   - 6.3 Demarcation of priority watershed
   - 6.4 Soil survey and capability map preparation and problem analysis.
   - 6.5 Collection of basic information for soil conservation planning pertaining to soil, climate, land use, crop yields, agriculture practices; engineering and forestry practices, population needs and customs, cattle census and allied details.
   - 6.6 Proposed treatment dealing with watershed management practices, agronomy and forestry practices, land treatment, structural measurement, miscellaneous specifications, phasing of project work; provision for cost estimate, cost/benefit ratio and general evaluation.
   - 6.7 Agronomy practices in Soil conservation.
     - 6.7.1 Contour farming
     - 6.7.2 Cover crops and legumes
     - 6.7.3 Composting
     - 6.7.4 Mixed and rotational cropping
     - 6.7.5 Green manuring and mulch farming
     - 6.7.6 Terracing and dry land farming
     - 6.7.7 Agro forestry
   - 6.8 Forestry Practices in Soil conservation:
     - 6.8.1 Wattling to stabilise debris and landslide.
     - 6.8.2 Log wood check dam.
     - 6.8.3 Plantation, ground/land development

7. Vegetative measures to check erosion at gully head, road slides, cut slopes, riverbanks, seacoasts etc.

FIELD EXERCISE: **(20 days)**

Preparation of Watershed Management Plan for a given micro-catchment.

FOREST ECONOMICS

Theory: 40 General:

1. **Introduction :** **(2)**
   Role of economics in forestry and its limitations in decision-making.

2. **Demand:** **(2)**

   Theory of demand; essential elements of demand, demand for forest products, demand schedule, elasticity of demand

3. **Supply:** **(2)**

   Concepts; law of supply, essential elements of supply, supply of forest products, supply schedule, elasticity of supply, Equilibrium point.

4. **Utility:** **(3)**

   Basic concepts and definition, concepts of total and marginal utility, law of diminishing marginal utility, the indifference curve and indifference map, consumption possibility line.

5. **Cost:** **(4)**

   Cost of production i.e. concept of real, opportunity and money cost, total, average, and marginal cost.

6. **Production Theory:** **(4)**

   Concepts of total, average and marginal products. Production function and laws of return i.e. increasing, constant and diminishing returns. Utility theory of production and marginal products in forestry.

7. **Brief account of pricing factors of production**i.e **(4)**
   Land————————— -Rent
   Labour————————Wages
   Capital————————Interest

8. **Market:** **(4)**

   Main features of market, Forms of market-Perfect, imperfect, monopoly market. Types of competition in the market. Market of various forest products viz. Timber, fuelwood, charcoal, seeds, bidi, bamboo, gums etc.

Forest Economics

1. **Economic Structure in Forestry Sector** **(3)**

   Sources of revenue in forestry sector, Price-size relationship. Value and treatment of time in forestry sector, Risk and uncertainty in forestry sector and its treatment.

2. **Rotation:** **(4)**

   Concept of Economic rotation-rotation of max. NPV Land Expectation Value (Faustman's formula).

3. **Factors affecting Economics:** **(4)**

Economics of spacing, thinning and pruning

4. **Economics of nature of crop:** **(4)**

Economics of monoculture, mosaic and mixed culture, species choice protection, harvesting etc

BIODIVERSITY CONSERVATION AND MANAGEMENT

Theory –45
Practical- 10

Part I **(10)**

1.0 Biodiversity: Definition, gene level, species level and ecosystem level. Value of Biodiversity, ecological, economic and other values. India as a mega diversity country, Biogeographic regions of India, Endemic centers of India and an overview of endemism in flora and fauna. **5**

2.0 Introduction to Plant and Animal Kingdom **5**

Part II **(5)**

Mega fauna of India, occurrence, distribution, present status and elementary ecology concerning Asian Elephant, Tiger, Rhinoceros, Musk deer, Gaur, Hoolock Gibbon, Nilgiritahr

An overview of Avifauna in India and Ramsar wetlands in India

Part III **(5)**

Conservation ethos of India. Wildlife Management definition, concept of carrying capacity, population structure, density and biomass, Home range and territory and an introduction to Ethology.

Need for Protected Area Network, National Parks and Sanctuaries of India with special emphasis on Kanha National Park, KeibulLamjao of Manipur, Bandipur, Gir, Gulf of Mannar (Coral reef Management), Namdapha National Park, their location, extent, flagship species, habitat description, major conservation measures, man animal conflict and an assessment of sources of threats to those protected areas. The concept of Eco-development.

Part IV **(5)**

insitu and exsitu conservation and the role of gene banks. Conservation breeding and Reintroduction. National Institutions involved in conservation. Role of NGOs in conservation of natural resources. Ecotourism.

Part V **(10)**

Ecological sampling Techniques, belt, quadrat and point techniques for enumeration of plants. Line transact analysis and other popular census techniques for animals. Causes of extinction, habitat destruction and degradation, fragmentation of habitat, introduction of alien species and other factors. Examples of critically endangered biota of India.

Part VI **(5)**

International conventions concerning biodiversity CITES, CBD, intellectual property rights, Bio piracy. Wildlife (Protection) Act, 1972 and Forest Conservation Act,1980 as corner stones of conservation in India. Biodiversity Bill/Act, Environmental pollution, Environmental laws and Environmental Impact Assessment.

Part VII

Biodiversity Conservation: **(5)**

1. Ecological & geopolitical significance of biodiversity
2. Biosphere reserves, with special reference to India.

Practicals - Ecological Census Techniques **(10)**

JOINT FOREST MANAGEMENT, RURAL AND TRIBAL DEVELOPMENT

Theory: 32

Field Exercise: 6

1. **Introduction to Concepts of Joint Forest Management and Participatory Approach**. **2)**
   - 1.1 **Community Forestry**: **(2)**
   - 1.2 Definition
   - 1.3 Role of Forestry in Rural Development
   - 1.4 Necessity-special significance in the context of energy and small timber requirement of India
2. **Agro-Forestry**: **(3)**
   - 2.1 Its need and scope on and around agricultural lands
   - 2.2 Role in rural economy and its effect on agricultural practices
   - 2.3 Establishment of Agro forestry
   - 2.4 Agro Forestry Models with Economic Analysis
   - 2.5 Role of forest department
3. **Social Forestry**: **(4)**
   - 3.1 Objectives and scope vis-à-vis Agro forestry
   - 3.2 Raising of trees for fodder, fuel wood, leaf manure and timber
   - 3.3 Development of pasture lands
   - 3.4 Avenue plantation
   - 3.5 Canal bank plantation
   - 3.6 Plantations along railway lines
   - 3.7 Choice of species
   - 3.8 Role of the forest department

4. **Recreation Forestry and Landscaping: (2)**
   - 4.1 Scope and need of Recreation Forestry
   - 4.2 Ecotourism in relation to generate employment and local economical upliftment and economic development
   - 4.3 Concept of integrated town planning and landscaping
   - 4.4 Creation, layout and design of parks, green zones/ green belts close to urban centers.

5. **Extension and Publicity*:* (3)**
   - 5.1 Role and mode of publicity in Agro and Social Forestry.
   - 5.2 Modes of Publicity
     - 5.2.1 Direct contact with the people
     - 5.2.2 Using mass publicity media-radio, television, posters etc.
   - 5.3 Establishing Demonstration and Interpretation centers
   - 5.4 Exposure through training, workshops, seminars and exhibitions.
   - 5.5 Incentives for tree planting both to landless and land holders.
   - 5.6 Competitions and contests for awareness generation

6. **Integrated rural development approach**: **(3)**
   - 6.1 Forestry in support to agriculture, animal husbandry and horticulture
   - 6.2 Forest based cottage industry in rural environment with proper marketing facility.
   - 6.3 Employment generation in raising, tending harvesting tree crops
   - 6.4 Alternative sources of energy

7. **Organization and legislation to support the programmes (1)**

8. **Future prospects in Forest Management (5)**
   - 8.1 Overall involvement of tribals (Past, Present and Scope) Emphasis on variety of Extension ForestryProgrammes like Agro-Farm-Forestry, Shelterbelt, other forms of productive forestry).
   - 8.2 Social Forestry and various Area Development Programmes.
     - 8.2.1 Family Development based programmes.
     - 8.2.2 Individual Beneficiary programme.
     - 8.2.3 Concept of voluntary agencies and their relevance to tribals with a special attention to various rural and tribal development programmes (IRDP, RLEGP, EGS, NREP, DDP, DPAP and TSP etc.).

9 **Tribals and Five Year Plans (7)**

Preparation of sub-plan for tribal areas. A study of planning commission guidelines.

FIELD EXERCISE: (6 Days)

Preparation of a Micro-plan for

(i) JFM,

(ii) Agro forestry giving suitable combinations of forest species and Agriculture/Horticulture/ Floriculture crop with year wise investment and return, inputs/outputs analysis and calculations of IRR.

HUMAN RESOURCES DEVELOPMENT AND MANAGEMENT

Lectures: 20
Field Exercise: 3 days

1. **Institutional:** **(10)**
   - 1.1 Organisational behavior:
     - 1.1.1 Structure and Suitability
     - 1.1.2 Motivation and Recognition
     - 1.1.3 Leadership styles
     - 1.1.4 Group Dynamics
     - 1.1.5 Management of conflict and stress
   - 1.2 Manpower planning:
     - 1.2.1 Goals
     - 1.2.2 Strategies
     - 1.2.3 Selection/Recruitment
     - 1.2.4 Career development
     - 1.2.5 Training and Research
   - 1.3 Communication skill and Management.
   - 1.4 Management systems and process
   - 1.5 Organizational culture and managerial ethos
   - 1.6 Management of organizational conflicts
   - 1.7 Managing change
   - 1.8 Organization structure and design
   - 1.9 Delegation and interdepartmental coordination
   - 1.10 Changing role of Government.
   - 1.11 Inter-Institutional exchange programs
   - 1.12 Anti-corruption measures
   - 1.13 Output evaluation

2. **Individual** **(10)**
   - 2.1 Analysing interpersonal relations
   - 2.2 Media and mob management
   - 2.3 Personality development
   - 2.4 Aptitude building
   - 2.5 Time management 2.6Transparency in working
   - 2.7 Accountability.

Field Exercises **(3 days)**

FOREST ACCOUNT & PROCEDURE

Theory Lectures: 40

GENERAL **(1)**

Organization of forest department: administrative and executive control. Classification of establishment- permanent, temporary and labour.

CASH ACCOUNT **(24)**

- General principles of book-keeping by single entry, its origin and advantages; accuracy, neatness and legibility in book- keeping. definitions of important terms in accounts.
- Classification of Government accounts; its necessity. Receipt and payments under various heads and subheads. Preparation of Budget and Annual Action Plan.
- Revenue and Capital Expenditure: Essential steps before incurring a revenue expenditure, sanctions, availability of funds, scale of rates etc.
- Definitions of cash and cash book; custody of cash chest and precautions in its use.
- Payment and its methods i.e. cash, cheque book transfer and R.T.R., letter of credit; writing of cheques and maintenance of cheque books; cancelled and lost cheques.
- Advances to contractors, disbursers and others and their accounting; recoveries of cash payment and their entries in the cash accounts.
- Different kinds of voucher for payments; muster rolls, measurement books and their preparation and maintenance. Register of sanctioned works and completion reports. Lost or missing receipt or vouchers.
- Receipt of revenue and its remittance into the treasury, i.e. cash, cheque, postal money-order, book transfer and R.T.R., refund of revenue.
- Forest deposits-Earnest money; Security deposits from subordinates and contractors.
- Maintenance of Cash book, entry of Cash transactions and closing and balancing of cash book; practice in writing cash-book; Divisional and range officer's daily cash account; supplementary accounts and objection statements.
- Contractors and disbursers ledger. Accounting procedure as followed by forest corporations.
- Treasury system of accounting/ study of different formats, disbursement process, Treasury cash book, Heads of Accounts, D.D.O's functions.

FOREST PRODUCE ACCOUNTING AND YIELD RETURNS **(5)**

- Categories of produce i.e. tree, timber, logs and scantlings; firewood, charcoal and other minor forest produce; Various places of storage i.e. forests, depots, transit and sale depots; separate entries for each category and depot.
- Agencies of removal: Government, Contractors and others-right holders and free grantees.
- Accounts and returns connected with departmental export of produce as under-

- Return showing receipt and disposals in sale deports.
- Return showing receipts and issue of timber and other produce.
- Return showing sale of timber and other produce, including drift and waif wood collected by Government agency.
- Bill and receipt book.
- Accounts and returns connected with the removal of produce by purchasers as under:-
    - Return showing sale of forest produce, cut and collected by purchasers.
    - Return showing outstanding on account of revenue.
    - Regulations of movement of forest produce permits and passes.
- Accounts and returns connected with the removal of produce by right-holders and free grantees as under:
    - Return showing free grants of timber & other produce.
    - Return showing grants to right-holders of timber and produce.
    - Permits and passes.
    - Accounting of seized and confiscated produce.
    - Shortage or losses. permissible limits and their accounting.

OFFICE PROCEDURE **(9)**

- Records of Forests and their maps and boundaries, annual plan of operations.
- Damage report register-compensation register and prosecution register. Record of stocks of forms. Forest offence register, Fire occurrence register and Fire maps- posting of.
- Record of books-maintenance of books concerning rules and regulations up-to-date.
- Custody and maintenance of stock in serviceable condition; its receipt and dispatch; wear and tear, purchase and writing off unserviceable stock and its disposal. Stock register and its maintenance stock receipt books, uniform register, hammer register.
- General office procedure, routine correspondence with higher authorities & subordinates; its receipt, dealing and dispatch. List of returns. Reports, Records; files, cases and registers maintained in range office. Rules regarding maintenance of records- classification, preservation and destruction of useless records.
    - Transfer of charge.
    - Office Inspection of range offices.

EXECUTION OF "CONSERVANCY AND WORKS" **(1)**

Various forms of contracts viz., piecework or petty contracts, schedule rates and lump-sun contracts and connected agreements and departmental execution procedure there of.

(A K Goyal)
Deputy Inspector General of Forests (RT)

3-17/99-RT (II) 21st June2004

Annexure-V

GOVERNMENT OF ODISHA
FOREST DEPARTMENT

OFFICE OF THE PRINCIPAL CHIEF CONSERVATOR OF FORESTS, ODISHA

Memo No. 3724 / 3F(M&IV) – 14/15

Dated, Bhubaneswar, the 04th March, 2015

To

The Chief Conservator of Forests,
(Training & Development) Cuttack.

Sub: **Revision of Syllabus for the Training Course of Foresters.**

Ref: Your memo No.323/5F-Trg-12/15, dt.18.2.2015

With reference to your memo No. cited above on the mentioned subject, I am directed to intimate that Principal Chief Conservator of Forests, Odisha has been pleased to approve the Syllabus for the Training Course of Foresters as submitted vide your memo under reference. One set Syllabus for the training Course of Foresters is enclosed herewith for needful action at your end.

Encl: As above

Sd/- 4.3.2015
Chief Conservator of Forests
(ME&IV)

Annexure-V (A)

GOVERNMENT OF ODISHA
FOREST DEPARTMENT

SYLLABUS

FOR
FORESTERS' TRAINING COURSE

Training & Development, Cuttack

CALCULATION OF EFFECTIVE WORKING DAYS

Total days available during the training - 365

Sl. No.	Particulars	Days
1	Sundays Excluding tour period	24
2	Second Saturdays Excluding tour period	8
3	Gazetted Holidays Excluding tour period	16
4	No. of days available for training	317
i	Joining and Registration	1
ii	Inaugural and Welcome Address	1
iii	Mid-term examination	8
iv	Final examination	14
v	Annual Sports	7
vi	Preparation of Final Result	5
vii	Celebration of important days	5
viii	Convocation	1
ix	No. of Lecture days (6 lectures per day)	188
x	Saturday Excursion for Field Practical	40
xi	Study Tour	47
	Total	**317**

TABLE OF CONTENTS

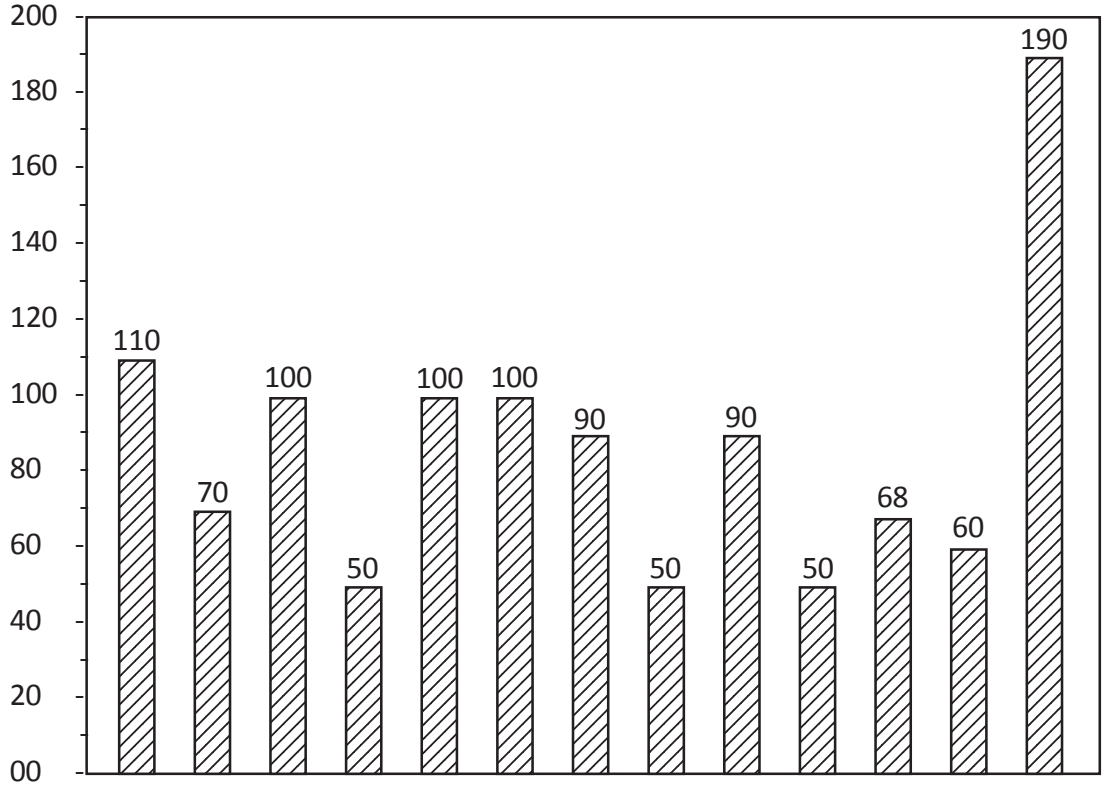
SUBJECT WISE ALLOTMENT OF MARKS

Sl. No.	Subject	Theory	Practical	Total
1	General Silviculture	100	-	100
2	Forest Utilization	100	-	100
3	Silvicultural System and Forest Management	100	-	100
4	Forest Engineering	100	-	100
5	Forest Survey	75	25	100
6	Forest Law	100	-	100
7	Extension Forestry, Joint Forest Management, Protection and Peoples participation	100	-	100
8	Mensuration	50	-	50
9	Wildlife Management	100	-	100
10	Ecology Environment SMC and Land use Management	100	-	100
11	Accounts and Procedure	50	-	50
12	Forest Botany	40	10	50
13	Computer & GIS Application	60	40	100
14	Total Subject Marks	1075	75	1150
15	Tour Marks	50	-	50
16	Conduct Marks	100	-	100
	Grand Total	**1225**	**75**	**1300**

SUBJECT WISE ALLOTMENT OF LECTURE HOURS (60 MINUTE) FOR FORESTER COURSE

Sl. No.	Subject	Hours
1	General Silviculture	110
2	Forest Utilization	70
3	Silvicultural System and Forest Management	100
4	Forest Engineering	50
5	Forest Survey	100
6	Forest Law	100
7	Extension Forestry, Joint Forest Management, Protection and Peoples participation	90
8	Mensuration	50
9	Wildlife Management	90
10	Ecology Environment SMC and Land use Management	50
11	Accounts and Procedure	68
12	Forest Botany	60
13	Computer & GIS Application	190

HISTOGRAM OF SUBJECT WISE ALLOTMENT OF LECTURE HOURS (60 MINUTE) FOR FORESTER COURSE



SYLLABUS FOR GENERAL SILVICULTURE

1. **Introduction -**Definition, object of study, Forestry, Relation of Silviculture with forestry and its branch.
2. The Tree and the Forest. The tree and parts of tree- crown, stein and Root, Growth and development of the tree, Reproduction of trees, the Forest, Classification of Forests, Growth of Forests.
3. Locality Factors- Definition and classification, Climatic factors, Topographic factors, Edaphic factors and Biotic factors.
4. Plant Succession (Out line only)- Definition, Kinds Of Successions, Causes Of Succession, Climax And Classification Of Climax.
5. Forest types-Definition and bases of classification, Brief description of groups, Sub groups and types.
6. Natural Regeneration (NR) - Definition, method of regeneration, Natural Regeneration from seed- seed production, seed dispersal, seed germination, seedling establishment, Dying back of seedlings, NR under clear felling system, NR under selection system, NR under shelter belt system. NR from coppice, cultural operations, Aided Natural Regeneration (ANR).
7. Artificial Regeneration- Definition and objects, objects of Reforestation, choice between AR & NR, Choice of species, mixture in plantation, selection of site, plantation estimate, seed source, seed collection, method of seed collection, extraction, storage, seed testing, seed treatment.

   Nursery- Definition, clarification, site selection, Fencing, Lav out, Bed preparation, inoculation of mycorrhiza. sowing, weeding, shading. Irrigation, transplanting, maintenance of fertility. Nursery register. Preparation of organic manure, vennicompost.

   Plantation- Plantation time table, Survey and boundary demarcation, soil map, plantation map fencing, soil preparation, planting, planting season, planting ‘method, entire planting with naked root, planting with ball of earth, stump planting, planting of branch & stem cuttings plantation design, calculation of number and spacing, Irrigation and application of fertilizer, Beating up, Nurse crop. Cover crop, under planting, weeding, fire and general protection.
8. Tending- Definition , importance and problems, weeding, cleaning. Thinning, Types of thinning in regular crops, Thinning in mixed plantation, Thinning in coppices crops, Thinning cycle, Thinning in Irregular crop, selection thinning, improvement felling, Girdling, prunning, climber control.
9. Forest genetics- Seed production Area, Plus tree, clonal seed orchard, clonal multiplication garden, Germplasm Bank.

Hi-Tech Nursery, Production of Quality Planting Material (QPM)

10. Forest Pathology- Definition common diseases found in important forest species, Nursery-diseases and preventive measures.

SYLLABUS FOR FOREST UTILIZATION

1. **Introduction:**

   Definition of forest utilization, its scope, Definition of forest produce, difference between major forest produce and minor forest produce, Timber classification.

2. **Harvesting:**
   a. Laying out of coupes, and tree marking, preparation of marking list.
   b. **Felling Tools:** Axe, bill hooks, saw (types of saw), wedges, cant hook, picaroons, debarking spade, log hook etc.
   c. **Felling operation:** Preparation and planning, felling season, general rules for felling, basis felling techniques with axe, saw with axe and saw combined, felling by roots, extraction of stumps, log marking, purpose of log marking.
   d. **Extraction :** Various methods of extraction by road, by water, by air, by animals.
   e. **Storage:** Various types of depots, their layout, various types of stacking with grading and numbering, stacking of timber and fire wood, maintenance of depots and depot record (register, forms, transit challan, passing certificates etc.) Protection of depots, depot clearance.

3. **Anatomical Structure and Properties of wood:**
   a. **Rough anatomy:** Pith, heart wood, sap wood, cambium layer, bark, annual ring, early wood, late wood, medullary rays, gum canal, resin canal etc.
   b. **Properties of Wood:**
      i. Natural properties (colour, lustre, odour, weight, grain, texture)
      ii. Mechanical properties (toughness, strength, flexibility elasticity, feasibility, hardness, durability, work ability).
      iii. Other properties (Seasoning quality, shrinking and swelling of wood, splitting and cracking, warping, moisture content, combustibility and heating power).

   Defects in wood:
   i. Defects due to abnormal growth: (KNOT, live knot, dead knot, twisted fibre, burrs, constriction due to climbers waviness etc.)
   ii. Defects due to rupture of tissues: (Checks, splits, shake (Heart shakes, Star shakes, Radial shakes, Cup shakes, Ring shakes)
   iii. Defects resulting from wounds, injuries, insect attack, fungal attack: (Prunning defects, broken branches, rind galls, insect attack, termite attack, bore attack, sea animal attack, fungal attack etc.)

4. **Timber seasoning and Wood Preservation:**
   a. **Timber seasoning:**
      i. Definition, necessity, general principles of seasoning.
      ii. Natural seasoning (air seasoning, water seasoning, girdling)
   b. **Wood preservation:**
      i. Objectives of wood preservation.
      ii. Chemical used in wood preservation (oil type, water soluble type, organic solvent type)

5. **Sale And Disposal: Systems of sale to purchasers**

   Lease of whole coupe, sale of selected trees, sale by means of license permits, Conversion and disposal of converted materials like logs, sawn sizes and fire wood. Sale procedures by OFDC Ltd and Raw Material Procurers (RMP) Auction, tender, bargain/ negotiation, earnest money deposit, security deposit etc.

6. **Use of Wood: Suitability of Indian timber for:**

   Fuel wood, Musical Instruments, Ply wood, Building, bridges, coal, mines, boat and ships, tent poles, Matches, Decorative purpose (Turnery, carving, toys), Paper pulp, Furniture making, Packing cases, Uses of waste wood (Particle board, saw dust board), Rifle butts, Sports goods, Tool handles.)

7. **Non Timber Forest Produce (NTFP):**
   - Definition
   - Grasses, Bamboo, Canes
   - Charcoal manufacturing
   - Oil seeds (Mahua, Karanja, Neem, mango hernel, Kusum seeds, Polanga seeds)
   - Tans and Dyes.
   - Gums, resin, resin tapping and resin products like turpentine oil and camphor ets.
   - Drugs, spices, edible products and poisons.
   - Animal products, minerals and miscellaneous product
   - Paper and pulp
   - Storage of minor forest produce items
   - Kendu leaves (departmental working of kendu leaves, bidi manufacturing)

   Non Destructive Methods of Collection of NTFP:
   - Parts of plant collected as NTFP
   - Safe methods of collection of NTFP and season of collection of NTFP
   - method of collection, processing and marketing of minor forest produce items in Odisha.
   - Role of NTFP in rural economy.

8. **Medicinal Plants:**
   - Raising of medicinal plant garden and commercial cultivation of medicinal plants.

- Uses of medicinal plants in curing different diseases.
- Important medicinal plant species existing in the forests of Odisha and preservation of endangered medicinal plant species.

9. **Forest Based Industries in Odisha:**

Paper industry, Oil Industry, Board industry, Mat Industry, Furniture industry (Timber, Cane, Bamboo, Sabai grass), Rope, Leaf plate, Broom, Lac, Tamarind, Tassar cocoon, Horn work, Wood carving.

SYLLABUS FOR SILVICULTURAL SYSTEMS AND FOREST MANAGEMENT

SILVICULTURL SYSTEM

Chapter (I) : Introduction (Definition, Classification of Silvicultural Systems, Conversion, Need for classification, Desirability of standardization of nomenclature of the systems)

Chapter (II) : Details study of : (a) Clear felling system, (b) Uniform System, (c) Selection system, (d) Simple Coppice system, (e) Coppice with standard/ with Reserve system.

Study of systems is to be followed with emphasis on (a) Removal of over wood, character of crop produced, method of getting regeneration, (b) Desirability and draw backs.

Chapter (III) : Management of bamboo forests (General description, Silviculture of bamboo, Silvicultural System, felling cycle and cutting rules, method of regeneration, tending.

Chapter (IV): Management of Road side Avenue and Canal side plantations.

FOREST MANAGEMENT

Chapter (I) : Introduction (Definition, principle of forest management National forest policy, Recommendation of NCA)

Chapter (II): Forest Organization

(Geological and ecological classification, functional classification, legal classification, Technical classification-block, Compartment, sub-compartment, administrative classification, management/ silviculture classification – working circle, felling cycle, cutting section.

Chapter (III) : Sustained Yield

(Definition, periodic and Intermittent yield pre-requisition for sustained yield management – its scope and limitations concept of progressive yield, Arguments for against sustained yield principle)

Chapter (IV) : Rotation of production period

(Definition, concept of rotation in regular and irregular forests, Types of rotations physical and silvicultural rotation, Rotation of maximum volume production, Rotation of highest income, Financial Rotation, Rotation of some important species, rotation and conversion period.

Chapter (V): The Normal Forest

(Definition, factors of normalization, Normal age-gradation/ classes, Normal increment, Normal growing stock, kind of abnormality)

Chapter (VI) : Increment (definition, CAI, MAI, Increment percent, Preseller's formula, effect of thinning on volume Increment)

Chapter (VII) : Working Plans (Introduction, Definition, objectives, Annual plan of operation, Working Plan and Working Schemes, Preliminary Working Plan, First P.R., Second P.R., Field works, Examination of territorial units, Compartment description and compartment history register, stock mapping, collection of statistical data, tree enumeration, regeneration survey and maps, management map and stock map, regeneration survey map and working plan map, enumeration map and forest type map, soil map, planytation journal, fire records, climate register, Game records, Cattle census.

SYLLABUS FOR FOREST ENGINEERING

1. **Building Materials**
   (a) Stone classification of stones, igneous, sedimentary and metamorphic rocks, calcareous, siliceous and argillaceous, qualities of good stone.
   (b) Bricks definition, comparison with stone-composition of common brick, Earth brick making- preparation of the brick earth, Advantages of kiln burning over clam burning, qualities of good bricks, standard size of bricks and number of bricks required per cum of brick work.
   (c) Sand natural source, pit, river, lake and sea sands specification for sand treatment before use bulking of sand and its effect.
   (d) Cement properties storage uses.
   (e) Mortars definition uses and cement mortars their proportion. mixing and laying precautions in using mortars amount required per cum of brick work and masonry with example.
   (f) Plaster object of plastering lime and cement plaster, their proportion and mixing methods of plastering a new brick wall, re-plastering pointing (an elementary idea)
   (g) Concrete- definition, ingredients, their selection and size proportion of ingredients for different works, method of mixing quantities of cement and broken stone and water required for making one cum concrete reinforced cement concrete, principles of reinforcing. and positions of bars in RCCF lintels, beams, slabs, columns and sunshade (No design calculation).

(h) Paints, uses ingredients of a paint.
(i) Miscellaneous-white wash colour was-distemper.

2. **Building Construction:**
(a) Site – selection and preparation of site for Forest Rest House and Quarters.
(b) Foundation, object, causes of failure and precautions, classification of soils, rocks gravel, sand clay and black cotton soil and type of foundation in each, S.B.C. of soils loads on foundation, width of foundations with examples, depts. of foundations with examples. Methods of securing safe foundations in sift soil (Clay and black cotton soil).
(c) Plinth, heights of plinth, damp proof course in foundations, floors and Walls, precautions against white ants.
(d) Walls, thickness of walls scaffolding for walls- construction of brick walls and stone walls.
(e) Brick work-definition of terms-stretcher, header, quoin, king and queen closers. Frog, bedding, toothing, racking, construction of walls in building, extending an old wall bounds.
(The (English, Flemish, stretcher and header bonds (use models).
(f) Lintels-wooden, stone RCCF lintels and sun shades (No calculation)
A lay typical dimensions in general use.
(g) Roof- classification-flat and pitched, parts of roof the pitch gable and hipped roofs construction of lean-to, pent, coupe, close coupes, collar beam, purlin roofs, and the king post and queen post, trussed roofs, RCCF roofs.
(h) Roof covering methods of laying, RCCF roof (no design)
(i) Flooring and filling in the foundation trenches.
(j) Estimate – the parts of an estimate taking out quantities, examples of an Estimate of small buildings, the data sheet and measurement books.

3. **Roads**
(a) General principles – objectives, classification, inspection paths, bridle paths Forest cart road and main cart roads, temporary, fair weather and permanent Roads, cross section of cart road system of metalling road surface. The Gradients, maximum, ruling minimum and average.
(b) Principles of road design the road width-berm-camber cross section of hill road, gradients, drainage of road in the plains and hill-road curves minimum radii, super elevation and widening at curves retaining and breast walls locations, causes of failure and precautions.
(c) Forest road alignment-reconnaissance, object, points to be noted and obligatory points chief consideration during alignment of road in the plains and a hill-road, preparation of road estimate, objects an items involved, clearing the road. Any earth work, area of cross sections and volumes by the end area, rules construction and use of the slope

template masonry works in the roadsand surface dressings the detailed and abstract estimate forms.

4. **Bridges:**
   - **(a)** General principles, object-types, causeway, pipe,
   - **(b)** Site provision of water way, selection of site main consideration for location and approaches provision of water way, main consideration in fixing water way and water way for small culverts and bridges, scour, definition, effect of obstruction and precaution against scour.
   - **(c)** Hume pipe, culverts.

5. **Water supply**
   - **(a)** Source of water, source of supply, Streams, ponds, springs and Tube wells, the water table.
   - **(b)** Sinking of wells, shallow wells, selection of site and deep wells.
   - **(c)** Purification of water-sedimentation and chlorination.
   - **(d)** Clearing and protection of wells.

6. **Fences:**
   Different kinds of fences and their construction.

7. Reserved Forest Boundary Pillars:
Construction of different kinds of boundary pillars, sign board.

SYLLABUS FOR FOREST SURVEY

1. **Introduction:**
   - (a) Definition, aim
   - (b) Uses of surveying-plan or map of area.
   - (c) Classification of survey.
   - 1. Land surveys.
     - i. Topographical surveys.
     - ii. Cadastral surveys, record of rights.
     - iii. City surveys.
     - iv. Engineering surveys.
   - 2. Classification based on method employed.
     - i. Triangulation surveys.
     - ii. Traverse surveys
   - 3. Classification based instruments used.
     - i. Chain survey
     - ii. Prismatic compass survey.
     - iii. Plane table survey.

(d) Two fundamental principles of surveying.
1. To work from whole to part,
2. To ascertain the dimensions of main lines and positions and important points by at least to independent.

2. **Scales:**
(a) Representative fraction.
(b) Plain scale, diagonal scale, construction of diagonal scale.
(c) Use of scales.

3. **Map and Map Reading:**
(a) Definition of map, characteristics of a map.
(b) Aim of map reading.
(c) map and picture, Map and plan comparisons.
(d) Essential requisites of map reading
i. Scale of map
ii. Conventional signs.
iii. Orientation.
(e) Method of finding true north
i. Watch method
ii. With prismatic compass
iii. With the help of pole star.
(f) Relief and its representation

1. Contours.
i. Horizontal equivalent, vertical interval.
ii. Contour representation of gentle, steep, uniform, concave, converse slope.
2. Hachure
3. Hill shadings.
4. Spot heights
5. Form lines.

4. **Linear Measurement:**
(a) Chains and tapes.
1. Chain
i. Type of chain (100', 66', 20 meters)
ii. Parts of chain
2. Tapes metallic tapes, linen tapes, their use
3. Steel bands

(b) Use of chains:
Testing, accuracy of a chain

(c) Chaining along slopes
Stepping the chain

(d) Ranging the line, ranging rods, direct ranging, indirect or reciprocal ranging.

5. **Chain Survey:**

(a) Chain triangulation, applicability.
(b) Equipment –chain, arrows, ranging rods, offset rods, optical square, cross-staff its construction and use.
(c) Reconnaissance, rough sketch.
(d) Scale
(e) Selection of stations
(f) Offsets rectangular, oblique and swing offsets.
(g) Field book, method of recording.
(h) Obstacles in chaining,
1. Those which can be chaired around but cannot be seen over (building, spurs etc.)
2. Those which can be seen over but cannot be chained over (river, etc.)
3. Those which can b seen over and chained around (ponds, etc.)

6. **Plane Table Survey:**

Scope and limitations, practical application in forest surveys i.e. laying out forest coupes.

7. **Prismatic Compass Survey:**

(a) Prismatic compass: Its construction and use,
(b) Graduation of a compass, bearings, angles,
(c) Observations with a compass, centering, levelling, recording bearing
(d) Meridians-true, magnetic and arbitrary.
(e) Magnetic declination.
1. True and magnetic bearings.
2. Whole circle and quadrant (or reduced) bearings and their inter relationship.
3. Necessity of recording back bearings.
4. Permissible errors.
5. Mathematical check of closed traverse.
6. Plotting a traverse.
   i. By parallel meridians at each station.
   ii. By included angles .
7. Closing error adjustment by graphical method.

8. **Computation of Areas:**

a. Computation from field notes.
Area of skeleton triangle, rectangle, square etc.
b. Computation from Plans:

1. Graphical method by division into squares.
2. Mechanical method-acre square and acre comb.

9. **Demarcation and Laying Out of Coupes:**

10. Global positioning system (GPS) – use in forestry & application of geographical information system (GIS) in forestry

SYLLABUS FOR FOREST LAW

General acquaintance with and working knowledge of the legal frame work of Managing the protection of forests and coverage of the following enactments & Rules.

1. The Orissa Forest Act, 1972
   a) Section 56 an other related Sections of the OFA, 1972 and their implication on prevention and detection of forest offences.
2. The Orissa Forest (Detection, Enquiry & Disposal of Forest Offence) Rules, 1980.
3. Penalties & Procedure Under the Orissa Forest Act, 1972
4. Application of the Indian Penal Code in Forest Offences.
   (a) Theft
   (b) Receiving stolen property
   (c) Criminal misappropriation
   (d) Criminal breach of trust
   (e) Mischief
   (f) Criminal trespass
   (g) Attempt to commit to offence
   (h) Abetment of offences
   (i) Unlawful assembly
   (j) Omitting to give aid and information and giving false information
   (k) Giving false evidence
   (l) Concealing offences
5. Legal Principles and Punishments:
   (a) Imprisonment and fine
   (b) Confiscation as a punishment under forest law.
6. Law of Criminal Procedure:
   (a) Classification of Offences
   Cognizable & Non-cognizable
   (b) Warrants and search warrants
   (c) Summons case, warrant case, summary trials

7. Other Forest Related Acts & Rules (in Brief)
    1. The Orissa Timber and Other Forest Produce Transit Rules, 1980
    2. The Orissa Forest Contract Rules, 1966
    3. The Orissa Kenduleaf (Control of Trade) Act, 1961 and Rules made there under
    4. The Orissa Forest Produce (Control of Trade) Act, 1981 and rules made there under
    5. The Orissa Saw Mills & Saw Pits (Control) Act, 1990 & Rules
    6. Other Miscellaneous Rules made under the Orissa Forest Act, 1972
        i. The Orissa Forest (Grazing of Cattle) Rules, 1980
        ii. The Orissa Forest (Fire Protection) Rules, 1972
8. The Wildlife (Protection) Act, 1972 and Rules, made there under
9. Forest Conservation Act, 1980 and Forest (Conservation) Rules
10. National Rural Employment Guarantee Act (NREGA), 2005
11. S.T. & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act., 2006 and Rules made there under, 2007
12. Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989
13. Right to Information Act, 2005 and Rules
14 . Biodiversity Act, 2002
15. Elementary Knowledge on Labour law (Minimum Wage Act, Work Man Compensation Act, Industrial Dispute Act)
16. Air Act
17. Water Act.

SYLLABUS FOR EXTENSION FORESTRY, JOINT FOREST MANAGEMENT, PROTECTION AND PEOPLE'S PARTICIPATION

EXTENSION FORESTRY

1. **Introduction:**
   - (a) Definition.
   - (b) Principles of Extension Forestry.
   - (c) Objective & Scope of Extension Forestry.

2. **Method and Practices of Extension Forestry:**
   - (a) Wood lots
   - (b) Development of Pasture land
   - (c) Plantation on Barren Hills.
   - (d) Reforestation of Depleted / Degraded Forests.
   - (e) Avenue Plantation
   - (f) Afforestation of Canal Bank / Railway Lines/ Foreshore Areas of irrigation Tanks.
   - (g) Institutional Plantation.

3. **Planting**

   Choice of Species, Nursery, Land Preparation and Techniques of Planting, Post-Planting Care and Management.

4. **Recreation Forestry/ Urban Forestry**
   - (a) Need, Scope, Planning and Layout Design of Park for Urban Centre

5. **Communication and Motivation**
   - (a) Group Contact, (b) Publicity, (c) Training

6. **Extension Forestry in Farm Lands / Farm Forestry**
   - a. Need & Scope.
   - b. Role of Farm forestry in Rural Economy
   - c. Establishment of Farm forest.
   - d. Choice of species
   - e. Role of Forest Department

JOINT FOREST MANAGEMENT :

1. Introduction
- (a) Joint Forest Management in Orissa – Its background and Progress.
- (b) Assessment of Forest Resource and Preparation of Micro Plans.
- (c) Participatory Rural Appraisal (PRA).
- (d) Principles and Method, Utility and application of PRA
- (e) Issue on Joint Forest Management
  - (i) Monitoring and Evaluation, Marketing JFM of JFM.
  - (ii) Conflict Resolutions.

(iii) Benefit sharing
(iv) Involvement of Women in JFM.

2. **Extension Tools for JFM**
   (a) Farm and Home Visits/ General Meetings / Group Contact/ Campaign/ Voluntary Local Leadership/ Exhibitions / Conducted Tours/ Publications/ Audio and Visual aids.

3. **Management of Human Resources:**
   (a) Forest and various means of livelihoods.
   (b) Role of NGO in Forest Management.
   (c) Relation of the Forest Department with village level organizations.
   (d) Motivation and awareness building.

4. **Public Relation in Forest Administration:**
   (a) Weaker section of the society and their dependence on forests and forests products rights and concessions.
   (b) Demand and supply of forest products and their impact on rural society.
   (c) Encroachments into forests and shifting cultivation,
   (d) Inter department relation.
   (e) How to organize and conduct meetings.
   (f) Public relation in day to day administration and involvement of local people in Protection and development of forests.
   (g) Relation of the Forest Department with village level organization.

5. **Tribal Culture and its Relation to Forestry:**
   (a) Types, distribution and demography of tribes of Orissa.
   (b) Details of a few tribes of Orissa Kondhs, Bhuyans and Juangas, bondas, sauras and Prhajas, santal and Kols.
   (c) Tribals and forests – their relationship, rights and concession, shifting cultivation.

FOREST PROTECTION

1. Susceptibility of Forest to Damage, Preliminaries involved.
2. Nature of Damages, Cause of Damages, Prevention, Combative and Remedial Measures:
   (a) Human agency – unauthorized felling, encroachment, poaching etc.
   (b) Fire – causes, effects on different species, fire lines, controlled fire and counter fire.
   (c) Plants other than fungi, i.e. weeds, climbers, epiphytes, parasites.
   (d) Animals other than insects –
      (i) Domestic animals – rotational and controlled grazing
      (ii) Wild animals including birds.
      (iii) Protection against animals – physical, biological, social and management methods.
   (e) Atmospheric agencies – frost, hail, wind, drought, lightening damage caused by insects, fungi and other pathogens and their control.

SYLLABUS FOR FOREST MENSURATION

1. Definition of forest mensuration and objects and scope:
2. Metric system of measurement
3. Measurement of diameter and girth of standing trees
   (a) Rules regarding breast heights measurement
   (b) Measuring with callipers, Advantages and disadvantages
   (c) Measuring with tape, precautions, advantages and disadvantages.
4. User of Abney's level in measurement of height of standing trees. Sources of error and how to avoid them:
5. Measurement of fuel stacks and volume
6. Measurement of felled trees and their out turn, volume of log by quarter girth formula
7. Cubic contents of round logs and sawn timbers
8. Areas of plain surface, squares, rectangles, tringles, trapezoids and circles
9. Plantation method- line planting, square planting quincunx planting triangular planting, calculation of seedlings required for plantation with respect to spacing.
10. Enumeration and marking.

SYLLABUS FOR WILDLIFE MANAGEMENT

1. **Introduction:**

   General idea on wildlife, its position with respect to other natural science, wildlife conservation, ethical, historical and cultural background.

2. **Importance of Wildlife:**
   a) Ecological, aesthetic, recreational values of wildlife.
   b) Useful products direct and indirect income to state and individuals.
   c) Useful, activities, negative effects (Damage, depredations etc.)

3. **Ecology and Biology of Wildlife:**
   a) Definition, concept, and object of study.
   b) Bio geographic regions, zoo geographic regions of India, wildlife habitat.
   c) Classification, description and distribution of Indian Wildlife.
   d) Wildlife population, structures, natality, mortality, concept of Carrying capacity.

4. **Field Techniques in Wildlife Census:**
   a) Census and its methods.
   b) Tracks and trails, kill evidence, markings.
   c) Miscellaneous methods, prevention of damages caused by wildlife.

5. **Management of Indian Wildlife (General)**
   a) Need for preservation of wildlife in India.
   b) General principles of management.
   c) Rare and threatened species of Orissa.

6. **Management of Certain Important Animals:**
   a) Large animal- tiger, leopards, wild dogs, bear, elephant, bison, wild buffalo, deer and antelope
   b) Small animals including aquatic ones, crocodiles, fish, snakes, birds, turtles.
   c) Chemical restrain and trans- locations of big animals.
   d) Wild animal depredations
   e) Wild life health Management.

7. **Conservation of Wildlife:**
   a) Aims, necessity of Protected Area.
   b) National Parks, sanctuaries, Zoological Parks and Gardens
   c) Tiger Reserves and Elephant Reserves.
   d) Crocodile farms, and snake parks
   e) Captive animals and their management.
   f) Protected areas and wildlife farms of Orissa.
   g) Preservation of genetic resources, animals and plants.
   h) Eco-development activities.

8. **Publicity-** Education and Awareness for Conservation of Wildlife.

SYLLABUS FOR ECOLOGY, ENVIRONMENT, SOIL AND MOISTURE CONSERVATION AND LAND USE MANAGEMENT

ECOLOGY

1. **Introductions:**
   a) Definition, environment, ecology, habitat, population, community, biosphere.
   b) Objects of study of ecology and environment;

2. **Ecosystem:**
   a) Definition: Sizes, major eco systems, forest, grassland, desert, artificial autotrophs and heterotrophs, parasites, saprophytes, symbionts, insects and insectivores, microfauna of the forest ecosystem. Balance of nature, Energy flow in the ecosystem, The energy and the biogeochemical cycles.

3. **Ecological Factors:**
   Factors affecting individual plants and plant community. Climatic, edaphic, topographic and biotic factors (Brief introduction) factors affecting individual plants, and plant community.

4. **Habitat Patterns:**

Definition: types of habitat aquatic, terrestrial and subdivisions, different vegetational regions tropical zone, temperate zone, various regions under above zones.

5. **Population Ecology:**

Population and their characteristics, The niche, competition, process of succession, kind of succession, hydrosere, xerosere, climax forest, Ecological adaptations, hydrophytes, xerophytes, mesophytes

ENVIRONMENT

1. a) Introduction, major components of environment, Land, water and atmosphere.
   b) Major use of Land, impact of increase in population, both human and domestic animals. Rational Land use.
   c) water resources, its uses and problems.
   d) Plant resource, biosphere reserve.
   e) Renewable and non-renewable natural resources,
   f) Impact of development projects, and industries on environment, Need for conservation of environment.

2. **Environmental Pollution:**
   a) Introduction, objects of study;
   b) Atmospheric pollution, and automobile exhausts, industrial exhausts.
   c) Water pollution, domestic waste, industrial discharge, radioactive waste, industrial exhaust, oil pollution, chlorinated hydrocarbons, Eutrophication.
   d) Soil pollution.
   e) Effects of environment pollution of forest ecosystems.

3. **Control of Environmental Pollution:**
   a) Role of vegetation, trees and forests in control – of environmental pollution.
   b) Role of other ecosystem in controlling environmental pollution.
   c) Role of Pollution Control Board.

4. **Eco-restoration And Biodiversity:**
   a) Definition of natural resources, Biodiversity and concept of their conservation.
   b) Various conservation measures of biodiversity.

SOIL AND MOISTURE CONSERVATION

1. (a) Soil In Relation To Forestry
      (i) Introduction
      (ii) Objects of Study.
      (iii) Soil Structure
      (iv) Soil Chemistry.

(b) Soil Ph, Salinity, alkalinity, effect of soil PH on plants, soil Ph tolerance of plants, Influence of soil PH on beneficial soil flora and fauna, influence of vegetation on soil PH.

(c) Soil moisture, its availability to plants, leaching, soil aeration, biotic components of soil including micro-organisms and their functions.

(d) Use of manure and chemical fertilizers in forestry operation, limitations-such use.

(e) Treatment of saline and alkaline soils.

(f) Cause of deterioration of soil, erosion and deposition, normal and accelerated erosion.

(g) Agencies wind, water, gravity, glacier, difference between wind and water erosion man as soil erosion agent, shifting cultivation.

(h) Process of erosion: Erosion by water rain drop, sheet, rill, gully (its shape and stages of its formation) pot hole, tunnel, water fall, bank erosion, wave erosion, land slide.

2. **Soil and water Conservation practices in different types of tracts.**

(i) Forest tracts:
Contour trenching,
Contour bunding, and improving composition.
Denuded area contour trenching, gully plugging, check dams, Afforestation including half moon trenches.

3. **Watershed Management**

(a) Definition of Watershed.

(b) Importance of watershed in forest and wildlife management.

(c) Components of watershed management.

(d) Planning and execution of watershed management.

LAND USE MANAGEMENT

1. Soil Conservation in grassland and their management.
2. Soil Conservation in catchments and basins- watershed management.

SYLLABUS FOR PROCEDURE & ACCOUNTS

1. **CASH ACCOUNT:**
   (a) Definition of cash and cash book, custody of cash chest and precautions in its uses.
   (b) Payments and its method i.e. cash, cheque, book transfer and R.T.R., Letter of Credit, writing of Cheque and maintenance of Cheque Book, cancelled and lost Cheque.
   (c) Advance to contractors, disbursers and others and their accounting, recoveries of cash payments and their entries in the cash accounts.
   (d) Different kinds of vouchers for payment, muster rolls, measurement book and their preparation and maintenance, register of sanctioned works and completion reports lost or missing receipts or vouchers.
   (e) Receipt of revenue and its remittance into the Treasury i.e. cash, Cheque, postal money order, book transfer and RRT refund of revenue.
   (f) Maintenance of the Range cash account according to different budget sub-heads, checking and balancing the money cash accounts.

2. **MANUAL FORMS AND REGISTERS:**
   (a) Introduction to the Orissa Forest Department Code, 1979
   (b) Maintenance of different forms in use, such as Form No.2, 3, 4 & 12 and other scheduled forms.
   (c) Maintenance of consumable store register and register of stores, tools and plant, writing of unserviceable store articles.

3. Definitions and explanatory notes on important terms like Budget, Revised Estimate, Capital and revenue expenditure, L.D.T., Book transfers, Suspense.

4. T.A. Rules & preparation of T.A. Bills of the subordinate staff.

5. Leave Rules

6. Different types of hammers, their use and custody.

7. Maintenance of tour diaries and tour particulars.

8. Funding to Vana Samrakhaa Samities (VSS) and village level organizations (VLOs), FDA account.

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SYLLABUS FOR FOREST BOTANY

1. **Introduction:**

   (a) Definition, botany in relation to mankind, Forest Botany, aim and scope.

   (b) Cell Biology: Cell Biology, and basic genetic principle.

2. **The Plant Kingdom:**

   (A) Parts of a typical flowering plants.

   (B) Vegetative parts

   (1) The root :

   i. Origin, primary, secondary adventitious roots, types of root systems with examples, characteristics of root, function of root, modification of root.

   ii. Importance of roots and their study in forestry.

   (2) The stem:

   i. Characteristics and types of stem, modification of stem.

   ii. Buds.

   iii. Branching, lateral racemose, cymose, dichotomous, branching, branching system of forest trees, crown and bole forms, factors affecting, and their development.

   (3) The leaf:

   i. Parts of typical leaf.

   ii. Nature (types) of leaves, shape of leaves, margin of leaves, apex of leaves, Venation of laves, arrangements of leaves (Phyllotaxy)

   (C) The reproductive parts:

   (1) The flower:

   i. Inflorescence.

   ii. Types of flower, parts of a typical flower, branch and thalamus.

   iii. Functions of various parts of flower i.e. calyx, corolla different forms, Androecium and its different parts, gynoecium and its different parts.

   (2) The fruit:

   i. General idea of fruits available in forest and their classification, dispersal of seed and fruits.

   (3) The seed:

   i. Types of seeds, different parts of seeds and their function types of seed germination, condition necessary for germination.

OUTLINES OF PLANT PHYSIOLOGY:

(a) Water relation in plant:

i. Necessity of water for plants, availability of water for plants.
ii. Phenomena involved in and mechanism of water absorption, factors affecting absorption of water.
iii. Translocation of water or ascent of sap.
iv. Absorption and transport of mineral salts or plant nutrients.
v. Transpiration, types of transpiration, mechanism of transpiration, factors affecting transpiration, significance of transpiration.

(b) Photosynthesis:

i. What is photosynthesis, significance of photosynthesis.
ii. Factors affecting photosynthesis, external factors e.g. light, carbon dioxide, temperature, water supply, internal factors e.g. chlorophyll, anatomical structure of leaf.

(c) Growth of Plant:

i. Definition, phases of growth, rate of growth.
ii. Conditions necessary for growth.
iii. Growth regulators or hormones and growth condition.

(d) Reproduction:

i. Vegetative reproduction, natural, artificial methods.
ii. Sexual reproduction.
iii. Asexual reproduction
iv. Special modes of reproduction.

(e) Mineral Nutrition of Plants:

1. Nitrogen fixation, definition and significance.
   i. Sources of nitrogen
   ii. Means of nitrogen fixation physical, biological
2. Macronutrients.
3. Micronutrients.

Field characteristics of important forest trees.

Indicator Plants : Plants are site indicators.

SYLLABUS FOR COMPUTER & GIS APPLICATION

i. Introducing Computer Systems:
   (a) Computer Applications
   (b) Generation of Computer
   (c) Computer Systems.
   (d) Benefits and limitations of Computers.

ii. Components of a PC System.
   (a) How does a computer work?
   (b) Software
   (c) Introducing Hardware.

iii. Introducing Classes of Portable Computers

iv. Turning off your Computer

v. Logging off

vi. Exploring Your Computer

vii. Managing the Control Panel

viii. Manipulating Folders and Files

ix. Managing Shortcuts

Microsoft Word

a. Working with various components of the Microsoft word environment.

b. Create a document.

c. Edit documents by locating and modifying text.

d. Format text and paragraphs.

e. Add tables to a document.

f. Add graphic elements to a document.

g. Proof documents to make them more accurate.

h. Control a document's page setup and its overall appearance.

Microsoft Excel

a. Work with an Excel worksheet by entering and selecting data in it.

b. Modify a worksheet by entering and selecting the data in it.

c. Format a worksheet.

d. Series.

e. Define Function.

f. Perform calculation.

g. Print a workbook contents.

h. Create charts.

Microsoft Power Point

a. Work with Power Point Environment.

b. Create a presentation.

c. Create a New Slide.

d. Slide Layout

e. Add tables to a presentation

f. Add charts and picture to a presentation.

g. Slide Design.

h. Background

i. Slide Effect.

j. Slide Transition.

k. Slide Show.

Internet

a. Evolution of the Internet.

b. World Wide Web.

c. Connecting to the Internet.

ii. **Introduction to the Browsers:**

a. Types of Web Browsers.

b. Components of Web Browsers.

iii. **Introduction to Search Engines**

a. Working of a search Engine.

b. Former Search Tools.

c. Advance Search Techniques.

d. Receiving an Sending Email.

e. Downloading and Uploading Text/ Photo/ Video

GIS

1. Geometrics – an overview
2. Introduction to Geographic Information System (GIS)
3. Introduction to map projections.
4. Satellite Remote Sensing.
5. Global Positioning Systems (GPS)
6. Field data capture method.
7. Digital Global Positioning System (DGPS)

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Submitted by

Sd/-

Chief Conservator of Forests

(Training & Development)

Cuttack

Annexure-V (B)

GOVERNMENT OF ODISHA
FOREST DEPARTMENT

SYLLABUS

FOR
SHORT TERM (FOUR MONTHS)
PROMOTEE FORESTERS' TRAINING COURSE

Training & Development, Cuttack

(i)

TABLE OF CONTENTS

(ii)

CALCULATION OF EFFECTIVE WORKING DAYS

Total days available during the training – 120

SL.No.	CONTENTS	Days
1	Joining and Registration	1
2	Inaugural and welcome Address	1
3	No.of lecture days	60
4	Study tour	16
5	Final Examination	4
6	Convocation	1
7	Sundays and holidays	37
	Total	120

(iii)

SUBJECTWISE ALLOTMENT OF MARKS

Sl.No.	Subjects	Total Marks	Lecture Hours
1	Forest Utilisation	100	50
2	Forest & Wildlife Management	100	60
3	Forest Engineering	100	50
4	Forest Survey & Mensuration	75+25	60
5	Forest Law	100	90
6	Extension Forestry & Joint Forest Management	100	50
	Total Subject Marks	**600**	**360**
7	Tour Marks	50	
8	Conduct Marks	100	
	Total	750	

N.B.

1. The candidate shall secure 40% pass marks in each subject from Sl.No.01 to 06
2. Failure in more than two subjects will entail failure and there shall be no consideration of such cases.
3. Honours – 75% in Aggregate with pass in all individual subjects.
4. The proposal for Board of Examination shall be submitted by the Chief Conservator of Forests, Training and Development, Cuttack to the Principal Chief Conservator of Forests, Odisha, Bhubaneswar and the Examination will be conducted after getting the approval of Principal Chief Conservator of Forests, Odisha, Bhubaneswar. Board of Examiners meeting is mandatory to discuss the performance of the trainees before declaring the Final Result.

SYLLABUS FOR FOREST UTILIZATION

I. Definition of Forest Utilization, its scope, Definition of forest product, difference between major forest product and minor forest produce, Timber classification.

II. HARVESTING.

a. Laying out of coupes and tree marking preparation of marking list.

b. Felling operation :- Preparation and planning, felling season, general rules for felling basic felling techniques with axe, saw, with axe and saw combined, power saw. Felling by roots, extraction of stumps log marking, purpose of log marking.

c. Extraction :– Various methods of extraction by road, by water, by air, by animals.

d. Storage :- Various types of depots, their layout, various types of stacking with grading and numbering, stacking of timber and fire wood, maintenance of depots and depots records (registers forms transit challans, passing certificates etc.) protection of depots, depots clearance.

e. Conversion:- Hand sawing, machine sawing, name of saw size materials after conversion, records and registers maintained in saw mills, management of saw mills, checking of saw mills.

f. Harvesting agencies:- By Forest Department

(i) By Forest Department: Organization of forest labour, use of implements,
System of wage payment, supervision and control
Maintenance of accounts and registers.

(ii) By OFDC Ltd: Objectives and function.

III. Defects in wood.

i. Defects due to abnormal growth
(KNOT, live knot, dead knot, twisted fibre, burns, constriction due to climbers, waviness etc.)

ii. Defects due to rupture of tissues
Checks, splits, shakes, (Heat shake, Stare shakes, Radial shakes, cup shakes, Ring shakes.

iii. Defects resulting from wounds, injuries, insect attack and fungal attack.
Prunning defects, broken branches, rinds galls, insect attack, termite attack, borer attack, sea animal attack, fungal attack etc.

IV. USES OF WOOD.

Suitability of Indian timbers for

a. Specialised uses for plywood, matches paper packing cases sports goods, handles.
b. Structural uses – Building, boat and ships, tent poles
c. Decorative purpose, furniture
d. Uses of waste wood – particle boards, artificial board.

V. NON TIMBER FOREST PRODUCTS (NTFP)

- Kendu leaves (departmental working of kendu leaves, Disposal of kendu leaves)
- Working of Bamboo by OFDC / RMP

VI. NON DESTRUCTIVE METHODS OF COLLECTION OF NTFP.

Parts of plant collected as NTFP

Safe methods of collection of NTFP and season of collection NTFP.

Methods of collection, processing and marking of minor forest produce items in Odisha.

Role of NTFP in rural economy.

VII. MEDICINAL PLANTS.

Raising of medicinal plant gardens and commercial cultivation of medicinal plants.

Uses of medicinal plants in curing different diseases.

Important medicinal plant species existing in the forests of Odisha and preservation of endangered medicinal plant species.

SYLLABUS FOR FOREST AND WILDLIFE MANAGEMENT

(A) SILVICULTURAL SYSTEM

1. INTRODUCTION

(a) Definition of silvicultural system
  (i) Classification of silvicultural systems
  (ii) Need for classification of silvicultural systems

2. DETAILED STUDY OF SYSTEMS

The study of systems is to be followed with emphasis on following points

Selection of systems:
  i) High forest selection system and its modification.

3. MANAGEMENT OF BAMBOO FORESTS

(a) General description

(b) Silviculture of bamboo

(c) Silvicultural system

(d) Felling cycle and cutting rules

(e) Methods of regeneration

(f) Tending

4. MANAGEMENT OF ROADSIDE AVENUE AND CANAL BACK PLANTATION

(B) FOREST MANAGEMENT

1. INTRODUCTION

Definition, principles of management, national forest policies, forest as a productive agent, Working Plan, yield (main, and subsidiary or intermediate) principles of sustained yield.

2. PRELIMINARY OF WORKING PLANS.

(a) Reserved forests and other demarcated forest, blocks, compartments maintenance of boundaries, compartment lines.

(b) Organisation of forest under Working Plans, Working Circles and Felling Series.

(c) Compartment description, collection of field data.

(d) Stock mapping, enumeration and regeneration.

(e) Working Plans prescriptions and control of prescriptions.

C. WILDLIFE MANAGEMENT

1. INTRODUCTION

General idea on wildlife, its position with respect to other natural sciences, wildlife conservation, ethical, historial and cultural background.

2. IMPORTANCE OF WIDLIFE

(a) Ecological, aesthetic, recreational,

(b) Useful products, direct and indirect income to state and individuals

(c) Useful, activities, negative effects (damagte, depredations ets.)

3. FIELD TECHNIQUES IN WILDLIFE CENSUS

(a) Census and its methods

(b) Tracks and trails, kill evidence, markings

(c) Miscellaneous methods, prevention of damages caused by wildlife

4. MANAGEMENT OF CERTAIN IMPORTANT ANIMALS

(a) Large animals, tiger, leopards, wild dogs, bear, elephant, bison, wild buffalo, deer and antelope.

(b) Small animals including aquatic ones, crocodile, fish, snakes, birds, turtles.

5. CONSERVATION OF WILDLIFE.

(a) Aims, necessity of protected areas.

(b) National Parks, Sanctuaries, Zoological Parks and Gardens

(c) Tiger Reserves and Elephant Reserves

(d) Crocodile farms and snake parks

(e) Protected areas and wildlife farms of Odisha.

SYLLABUS FOR FOREST ENGINEERING

I. BUILDING MATERIALS

(a) Stone - classification of stones, igneous, sedimentary and metamorphic rocks calcareous, siliceous and argillaceous rocks, qualities of good stone, quarrying, digging.

(b) Bricks - definition comparison with stone comparison of common brick. Earths brick making preparation of the brick earth, moulding drying and Burning in clamps and the kiln. Advantages of kiln.

Burning over clamp burning, qualities of a good brick, standard size of bricks and number of bricks required per cum. of brick work with examples surkhi and brick bats.

(c) Sand – natural source pit, river, lake and sea sands, specification for sand, treatment before use bulking of sand and its effect.

(d) Cement – Properties storages, uses.

(e) Mortars – definition, uses mud, lime and cement mortars, their preparation mixing and laying precautions in using mortars, amount required per cum of brick work and masonry with example.

(f) Plaster – object of plastering, lime and cement plaster, their preparation and mixing methods of plastering a new brick walls, re-plastering.

(g) Concrete - definition, ingredients, their selection and size-proportion of ingredients for different works, method of mixing and laying line concrete, of reinforcing and position of barks in RCC lintels, slabs, columns and sunshade (Non-design calculation).

2. BUILDING CONSTRUCTION

(a) Site selection and preparation of site for Forest Rest House and Quarters.

(b) Foundation, object, causes of failure and precautions, classification of soils, rock gravels, sand, clay and black cotton soil and type of foundation in each examples. Methods of securing safe foundations in soft soil (clay and black cotton soil).

(c) Plinth, heights of plinth, damp proof course in foundation, floors and walls, precautions against while ants.

(d) Brick works – definition of terms – stretcher, header, quoin, king and queen Closers, bedding, toothing racking, construction of walls in a building, in brick works, definition and requirement of a good bonds. The English, Flemish, stretcher and header bonds (use models).

(e) Roof covering methods of laying and fixing thatch, tiles. GCI sheets, bricks terraced and RCC roofs (no design).

(f) Sashes, fan, light, ventilator and clerstor window.

(g) Estimates – the parts of an estimate taking out quantities, examples of an Estimate of small building, and measurement books.

3. ROADS

(a) General principles- Objectives, classifications, inspection paths, bridle paths Forest cart road and main cart roads, temporary, fair weather and permanent roads, cross section of a cart road system of metalling road surface. The gradients, maximums, ruling minimum and average.

(b) Principles of road design the road width-berm – camber cross section of hill.

Road, gradients, earth work, drainage of road in the plain and hill-road curves minimum radii, super elevation and widening at curves retaining and breast walls, locations, causes of failure and precautions.

4. WATER SUPPLY

(a) Sinking of wells, shallow wells, selection of site and brick.

(b) Purification of water-sedimentation and chlorination.

(c) Clearing and protection of wells,

5. FENCES

Different kinds of fences and their construction.

6. RESERVED FOREST AND BOUNDARY PILLARS.

Construction of different kinds of boundary pillars, sign boards.

SYLLABUS FOR FOREST SURVEY AND MENSURATION

A. SURVEY

I. INTRODUCTION

(a) Definition, aim

(b) Uses of surveying plan or map of area.

(c) Classification of survey

1. Classification based on methods employed.

i) Triangulation surveys

ii) Traverse surveys.

2. Classification based instruments used.

i) Chain survey

ii) Prismatic compass survey

iii) Place table survey.

(d) Two fundamental principles of surveying.

1. To work from whole to part.
2. To ascertain the dimensions of main lines and positions and important points by at least tow independent means.

II. SCALES

(a) Representative fraction.

(b) Plain scale, diagonal scale, construction of diagonal scale.

(c) Use of scales.

3. MAP AND MAP READING

(a) Definition of map, characteristics of a map

(b) Aim of map reading.

(c) Essential requisite of map reading.

i. Scale of map

ii. Conventional signs.

iii. Orientation

(d) Relief and its representation

1. Contours

i. Horizontals equivalent, vertical interval.

ii. Contour representation of gentle, steep uniform

2. Spot heights.

3. Form lines.

4. LINER MEASUREMENT:

(a) Chains and tapes:

1. Chain

i. Type of chain (100'', 66', 20 meters)

ii. Parts of chain

(b) Use of chains:

1. Testing, accuracy of a chain

2. Adjusting of standardizing the chain, correcting,

(c) Chaining along slopes.

1. Stepping the chain.

(d) Ranging the line, ranging, rods, direct ranging, indirect or reciprocal ranging.

CHAIN SURVEY:

(a) Chain triangulation, applicability.

(b) Equipment-chain, arrows, ranging rods, offset rods, optical square, cross-staff its construction and use,

(c) Scale.

(d) Selection of stations.

(e) Oblique and swing offset.

(f) Field book, method of recording.

(g) Obstacle in chaining.

6. PRISMATIC COMPASS SURVEY:

(a) Prismatic compass

(b) Bearing, angles,

(c) Observations with a compass, centering, levelling, recording bearing,.

(d) Plotting a traverse .

i. By parallel meridians at each station.

ii. By included angles.

iii. By circular protractor.

(c) Closing error adjustment by graphical method.

7. COMPUTATION OF AREAS:

a. Computation from field notes.

1. Area of skeleton triangle, rectangle, square etc.

2. Area along boundaries, irregular strips (mean offset method)

b. Computation from plans:

8. Demarcation and Laying out of Coupes:

9. Global Positioning System (GPS) – use in forestry and application of geographical information system (GIS) in forestry.

B. MENSURATION:

1. DEFINITION OF FOREST MENSURATION AND OBJECTS OF MENSURATION AND SCOPE

2. MEASUREMENT OF DIAMETER AND GIRTH OF STANDING TREES

(a) Rules regarding breast heights measurement.

(b) Measuring with callipers, precautions to be taken while purchasing of constructing callipers or while measuring with them. Advantages and disadvantages.

(c) Measuring with tape, precautions, advantages and disadvantages. Use of diameter tapes.

3. USE OF ABNEY'S LEVEL AND MEASUREMENT OF HEIGHT OF STANDING TREES.

4. MEASUREMENT OF FUEL STACKS.

5. MEASUREMENT OF FELLED TREES AND THEIR OUT TURN, VOLUME OF LOG BY QUARTER GIRTH FORMULA.

6. CUBIC CONTENTS OF ROUND LOGS AND SAWN TIMBERS.

7. METRIC SYSTEM OF MEASUREMENT.

8. TRIANGLES, TRAPEZOIDS.

SYLLABUS FOR FOREST LAW

General acquaintance with and working knowledge of the legal frame work of Managing the protection of forests and coverage of the following enactments & Rules.

1. THE ORISSA FOREST ACT, 1972
2. THE ORISSA FOREST (DETECTION, ENQUIRY & DISPOSAL OF FOREST OFFENCE) RULES, 1980.
   a) Section 56 an other related Sections of the OFA, 1972 and their implication on prevention and detection of forest offences.
3. PENALTIES & PROCEDURE UNDER THE ORISSA FOREST ACT, 1972
4. APPLICATION OF THE INDIAN PENAL CODE IN FOREST OFFENCES.
   (a) Theft
   (b) Receiving stolen property
   (c) Criminal misappropriation
   (d) Criminal breach of trust
   (e) Mischief
   (f) Criminal trespass
   (g) Attempt to commit to offence
   (h) Abetment of offences
   (i) Unlawful assembly
   (j) Omitting to give aid and information and giving false information
   (k) Giving false evidence
   (l) Concealing offences
5. LEGAL PRINCIPLES AND PUNISHMENTS:
   (a) Imprisonment and fine
   (b) Confiscation as a punishment under forest law.
6. LAW OF CRIMINAL PROCEDURE:
   (a) Classification of Offences
      1. Cognizable
      2. Non-cognizable
   (b) Warrants and search warrants

(c) Summons case, warrant case, summary trials

(d) Appeal, Revision, Acquittal, Conviction, Discharge

7. The Orissa Timber and Other Forest Produce Transit Rules, 1980
8. The Orissa Forest Contract Rules, 1966
9. Hammers – Property hammer, felling hammer, T.P.U. Hammer, Released hammer, Pass (Sold) hammer, Seize hammer, F.G.'s Axe-cum-seize hammer
10. The Orissa Kenduleaf (Control of Trade) Act, 1961 and Rules made there under
11. The Orissa Forest Produce (Control of Trade) Act, 1981 and rules made there under
12. The Orissa Saw Mills & Saw Pits (Control) Act, 1990 & Rules
13. The Wildlife (Protection) Act, 1972 and Rules, made there under
14. Forest Conservation Act, 1980 and Forest (Conservation) Rules OF 2013/ 2014
15. Elementary Knowledge on Labour law (Minimum Wage Act, Work Man Compensation Act, Industrial Dispute Act)
16. National Rural Employment Guarantee Act (NREGA), 2005.
17. S.T. & Other Traditional Forest Dwellers (Recognition of Forest Rights) Act., 2006 and Rules made there under, 2007.
18. Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989.
19. Right to Information Act, 2005
20. Biodiversity Act, 2002 & Rules.

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SYLLABUS FOR EXTENSION FORESTRY, JOINT FOREST MANAGEMENT

EXTENSION FORESTRY

1. (a) Definition.
   (b) Principles of Extension Forestry.
   (c) Objective & Scope of Extension Forestry.
2. **Method and Practices of Extension Forestry:**
   (a) Plantation on Barren Hills.
   (b) Reforestation of Depleted Forests.
   (c) Rehabilitation of Degraded Forests.
   (d) Avenue Plantation.
   (e) Afforestation of Canal Bank.
3. **Planting**
   (a) Choice of Species
   (b) Nursery
   (c) Land Preparation and Techniques of Planting
   (d) Post-Planting Care

JOINT FOREST MANAGEMENT :

1. JOINT FOREST MANAGEMENT
   (a) Joint Forest Management in Orissa – Its background and Progress.
   (b) Legal framework of JFM
   (c) Assessment of Forest Resource and Preparation of Micro Plans.
      (i) Planning village visit.
      (ii) Identification of village leaders villager organization and NGOs.
      (iii) Discussion with villagers regarding their needs.
      (iv) Forest resource inventory by way of collection of household data and group data
      (v) Preparation of resource map
      (vi) Filling of micro plan format.
   (d) Participatory Rural Appraisal (PRA).

(i) Object and scope of PRA

(ii) Method of PRA

(e) Issue on Joint Forest Management

(i) JFM in Rural Development

(ii) Conflict Resolutions.

(iii) Benefit sharing

(iv) Involvement of Women in JFM.

2. **Management of Human Resources:**

(a) Forest and various means of livelihoods.

(b) Role of NGO in Forest Management.

(c) Relation of the Forest Department with village level organizations.

(d) Women & Forest resources management and utilization.

(e) Motivation and awareness building.

3. **Public Relation in Forest Administration:**

(a) The forest organization Indian scene in Orissa, other organization. Both at national and State Level related to forest.

(b) Weaker section of the society and their dependence on forests and forests products rights and concessions.

(c) Demand and supply of forest products and their impact on rural society.

(d) Encroachments into forests and shifting cultivation,

(e) Inter department relation.

(f) How to organize and conduct meetings.

(g) Public relation in day to day administration and involvement of local people in Protection and development of forests.

(h) Relation of the Forest Department with village level organization.

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Annexure-VI

INDUCTION TRAINING SYLLABUS
FOR
FOREST GUARDS

GOVERNMENT OF ODISHA
FOREST DEPARTMENT

Subject wise allotment of marks

Sl. No.	Subjects	Theory	Practical	Total
1	General Silviculture	100	-	100
2	Survey, Mensuration & Engineering	75	25(Survey)	100
3	Forest Utilisation	50	-	50
4	Forest Botany	40	10	50
5	Forest Law	50	-	50
6	Wild life Management	50	-	50
7	Accounts & Procedure	50	-	50
8	Environment Conservation	50	-	50
9	Forest Management & Protection	50	-	50
10	Communication & Forest Extension	50	-	50
11	Computer & GIS Applications	60	40	100
12	Nursery	-	-	
13	Total Subject Marks	625	75	700
14	Tour Marks	50	-	50
15	Conduct Marks	100	-	100
	Grand Total	**775**	**75**	**850**

SUBJECT WISE ALLOTMENT OF LECTURE HOURS (60 MINUTE) FOR FOREST GUARD COURSE

SL.NO	SUBJECT	HOURS
1	General Silviculture	60
2	Survey, Mensuration & Engineering	90
3	Forest Utilisation	50
4	Forest Botany	25
5	Forest Law	50
6	Wild life Management	30
7	Accounts & Procedure	25
8	Environmental Conservation	25
9	Forest Management & Protection	25
10	Communication & Forest Extension	30
11	Computer & GIS Applications	190

GENERAL SILVICULTURE

1. Introduction :

- ❖ Brief history of forestry in the state.
- ❖ Over view of forest resources of the state.
- ❖ Different categories of forests of the state.

2. Role of Forests :

- ❖ Importance of forest-general & special.
- ❖ Protective/productive/Aesthetic functions.
- ❖ Environmental Conservation.

3. Growth of tree :

- ❖ Tree growth, various stages of tree:- seedling, sapling, pole, tree.
- ❖ Parts of tree-Stem, Branches, Crown.

4. Growth of Forests :

- ❖ Factors affecting growth:- climatic, topographic, edaphic, biotic.
- ❖ Impact of underlying rocks on soil, soil/rock types of the state.
- ❖ Concept of soil profile, important characteristics, PH, nutrients, porosity.
- ❖ Nutrient cycle, humus & soil organic matter.

5. Natural Regeneration :

- ❖ Removal of mature trees as pre-requisite for regeneration.
- ❖ Silvicultural Systems.
- ❖ Study of the Following Systems:-
  - (a) Clear felling systems-coppice/uniform.
  - (b) Selection system.
- ❖ Method & importance of regeneration survey.
- ❖ Marking Rules for different systems.
- ❖ Growing harvestable timber.
- ❖ Yield regulation, Sustained yield.

6. Regeneration of Bamboos :

- ❖ Special characteristics of this type of forest crop.

- ❖ Bamboo cutting
- ❖ Subsidiary silvicultural operations in Bamboo coupes.

7. Man madeForest :

- ❖ Need for plantation-reforestation/ afforestation.
- ❖ Steps in plantations.
- ❖ Site & Species Selection.
- ❖ Nursery.

(A) Nursery Works:

- ❖ Temporary, Permanent, Rab, site selection.
- ❖ Seed collection/storage/treatment(details of some important species

Viz. sal, Teak, Bija, Sissoo, Gambhar, Bamboo, Bandhan, Asan, Kurum, Kangada, Sidha, Chakunda, Acacia, Eucalyptus, Casuarina, Cashew-nut, including time generation, seed requirement per hectare of plantation.

- ❖ Tools & techniques used in modern nurseries.
- ❖ Preparations of planting stock, root shoot cutting, budding, grafting, layering.
- ❖ Maintenance of nursery register.
- ❖ Raising of tall plants.

(B) Plantation :

- ❖ Treatment map.
- ❖ Demarcation of plantation site.
- ❖ Preparation of plantation site, alignment & staking.
- ❖ Plantation layout-sections, inspection paths.
- ❖ Pitting-time & size, planting out.
- ❖ Use of Pesticide.
- ❖ Planting of root-shoot cuttings.
- ❖ Clonal plantation & grafting techniques.
- ❖ Plantation season.
- ❖ Casualty replacement.
- ❖ Preparation & Maintenance of Plantation journal.

(C) Post-plantation operation :

- ❖ Weeding/soil working-mulching, staggered trench.
- ❖ Manuring, fertilizer application.

- ❖ Survival growth assessment.

❖ Tending operations, thinning-types/methods, pruning, improvement, felling, cleaning in plantations-coppice coupes & selection coupes.

8. Methods of assisting natural regeneration :

- ❖ Climber control in growing stock.
- ❖ Cutting back of live high stumps.
- ❖ Singling out of multiple coppice shoots.
- ❖ Soil & water conservation measures.
- ❖ Canopy manipulation.
- ❖ Soil working, hoeing, ploughing of seed fall areas.
- ❖ Protection against fire, grazing, illicit cutting of trees.
- ❖ Eradication of weeds like Eupatorium, Lantana.

9. Brief idea about tree improvement programme :

❖ Collection of seeds from Plus trees, Elite trees, seed production area, clonal seed orchard, seedling seed orchard.

10. Common diseases of important forest species :

- ❖ Sal, Teak, Gambhar, Sissoo& Bamboo.

SURVEY, MENSURATION & ENGINEERING

(A) Survey

1. (i) Definition of Survey.
   (ii) Scope of Forest Survey.
   (iii) Types of Survey.
2. (i) Definition of Scale.
   (ii) Types of Scale-Plane Scale, Diagonal Scale, Vernier Scale & their uses.
3. (i) Simple Knowledge on angle, triangle, circle, rectangle, square * cylinder.
   (ii) Area of triangle, circle, rectangle, square & cylinder.
4. Chain & Chain Survey
   (i) Definition Kinds of chains and their uses.
   (ii) Testing accuracy of a chain.
   (iii) General idea about ranging (direct and reciprocal) offset, optical square crass staff and Procedure for ranging by avoiding obstacles.
   (iv) Chaining process on plain and hill tracks.
   (v) Chain survey and its applicability.
5. Prismatic Compass Survey
   (i) Related terms like meridians, magnetic variation, magnetic dip.
   (ii) Different parts of prismatic compass.
   (iii) Angle, bearing, forward bearing and backward bearing.
   (iv) Use of prismatic compass in forest survey.
   (v) Precautions while using prismatic compass.
   (vi) Preliminary idea about plotting of map and calculation of area.
6. Plane table survey-
   (i) Different parts, its accessories and uses.
   (ii) Advantages and disadvantages in the use of plane table.
7. (i) Elementary principles of map reading.
   (ii) Brief idea about Topo Sheet, Village Sheet and Cadastral Sheet.
   (iii) Thematic maps.
8. (i) Elementary idea about use of GPS in Forest Survey.
   (ii) Marking way points and computation of idea.

(iii) Maps in GIS domain.

(B) Mensuration

1. Measurement of diameter and girth of the standing trees-
   (i) Rules regarding breast height measurement.
   (ii) Measuring with Calliper and tape advantages and disadvantages.
2. Measurement of height without instruments shadow and stick method.
3. Simple calculation of surface area and volume.
4. Units of Metric and British system.

   (Length, area and volume and their conversion from one to the other)
5. Calculation of number of plants to be planted with a given spacing.
6. Calculation of volume of stocked timber.
7. Field records and Rules for working and enumeration.
8. Calculation of average height and girth of trees.
9. Management of labour with reference to out-turn of works.

(C) Engineering

1. Introduction :

   General idea on the benefit, scope and applicability of forest engineering.
2. Building materials :
   (i) Stone-Different types of stones, collection and blasting of stones.
   (ii) Bricks-Classification of bricks, characteristics of 1st Class bricks, number of bricks required for 100 cft. of brick works, size of bricks, suitability of earth for brick manufacturing and various process of brick manufacturing.
   (iii) Brief ideas about title, lime, cement, sand, metal and chips.
   (iv) Mortar-Lime, Cement and mud mortar.
   (v) Concrete-Lime, cement, R.C.C.
   (vi) Plastering and pointing-Lime plaster, cement plaster, mud plaster, method of application of plaster, defects in plastering and their remedy, preparation of surface for plastering and pointing, curing and its objective.
3. Building Construction :
   (i) (a) Selection of site.
   (b) Foundation, plinth, super structure, floor, masonry wall (brick or stone).
   (ii) Doors and windows-Panel, batten, glazed.

(iii) Roof:

(a) Kinds of roof, its advantage and disadvantage.

(b) Different parts of roof.

(c) Brief idea about R.C.C. roof.

4. Roads and Bridges :

(i) Forest Roads:

(a) Types and its application.

(b) General idea of road alignment in hills and plains.

(c) Construction and repair.

(d) Shorts notes:- Berms, super-elevation, gradient, retaining wall, breast wall, side drain, cross drain, catch water drain, burrow pit, dead man, hair pin bend.

(ii) Bridges and cross drainage structure:-

(a) Different parts of a simple wooden bridge.

(b) Culverts and causeways.

5. Miscellaneous :

(i) Wells:

(a) Selection of site.

(b) Elementary idea about construction, repair and cleaning.

(ii) General idea on:

(a) Construction of Watch Tower.

(b) Digging of tanks in forests.

(iii) General idea on:

Construction of soil conservation structures i.e water harvesting structure, staggered contour trench, contour bunding, percolation tank, gully plugging etc.

(iv) Digging of Trenches:-

(a) Elephant proof trench.

(b) Cattle proof trench.

(c) Stone walling for fire protection.

(v) Problems:

Simple volumetric and area calculation of various works such as earth work, white washing and ascertaining the quantities of building materials used in brick and stone masonry.

FOREST UTILISATION

1. Timber and Firewood

- ❖ Felling and logging implements:- Axe, Saws, Bill hook.
- ❖ Rules for avoiding damage to standing trees in course of felling, Logging and dragging operations.
- ❖ Comparative advantages of different modes of felling.
- ❖ Season of felling.

2. Conversion Method

- ❖ Logging, squaring, rough dressing and squaring, machine sawing.
- ❖ Types of converted timber such as beams, planks scantlings etc.
- ❖ Railway sleepers.

3. Transport of Timber

- ❖ By land route including dragging, rolling, sliding down the hill slopes.
- ❖ By water ways through floating and rafting.

4. Timber Depots

(a) Disposal of Timber

- ❖ Grading and stocking.
- ❖ Forest Depot, transit depot and sales depot records & returns maintained by depots.
- ❖ Measurement of volume, ready reckoner.

(b) Wood Market

- ❖ Operations by Government agencies.
- ❖ Operations by private agencies.
- ❖ Important and export of timber.
- ❖ Sawing resawing& conversions.
- ❖ Various regulations on transactions of timber.

5. Uses of twenty common species of Timber.
Wood seasoning and wood preservation.

6. Common defects in timber such as rots borer attack bends climber attack shakes buttress etc.

7. Mode of Disposal

- ❖ Auction Sale.
- ❖ Tender Sale.
- ❖ Retail Sale.

8. Identification of Timber of different species.
9. Fuel wood and Charcoal
   - ❖ Method of harvest/Collection/Gathering of fuel wood stacking of fuel wood measurement of stacked volume and computation of weights.
   - ❖ Methods of producing wood charcoal qualities of wood charcoal uses of wood charcoal.
   - ❖ Difference between coal and charcoal.
10. Non Timber Forest Produce
    - ❖ Name and use of important items of NTFP.
    - ❖ Rough idea about the occurrence of various species.
    - ❖ Policy on transfer of control and ownership over several items of MFP to the Gram Panchayat.
    - ❖ Working of kendu leaves.
    - ❖ Quantitative of restriction on collection of sal seeds.
    - ❖ Restriction of collection of barks.
    - ❖ Important medicinal plants and their application non destructive harvest methods.
    - ❖ Raising of herbal gardens.
11. Other Utilities
    - ❖ Food items derive from forest such as tubers leaves fruits seeds.
    - ❖ Fiber Yielding species.
    - ❖ Katha (Khair) Lac Gums, Dyes, Thatch Grass, Oil Seeds, Lemon Grass, Khas (Vertivera) Canes etc.
    - ❖ Various species of bamboo and applications.
    - ❖ Sal seeds.
12. Role of NTFP in rural economy and livelihood.
13. Commercial uses of various forests species their trade links certification of forest products sustained yield concept.
14. Inventory of forest usages- Field exercise.

FOREST BOTANY

1. Introduction

Classification of plants on the basis of habit (Herbs, Shrubs, Trees Climbers)

2. Local, English, Botanical Names of 50 common species of flora in the forests of Orissa along with characteristics of each of these species for identification purpose.

3. a) Parts of any plant and their functions.

   b) Pollination.

   c) Photosynthesis.

4. Description and study of the fruits and seeds of 30 important forest tree species and methods of their dispersal.

5. Viability and germination of seeds.

6. Vegetative propagation methods Rooting of cutting.

Forest Botany (Practical)

Identification of local species- 10 marks

(Identification of local species shall be done while going on field tours and sanctuary excursions).

Floral parts of Hibiscus rosalchinensis phyllotaxy of Magnifier indica and Alstoniascholaris modified roots stems leaves adventitious roots butteresses toot slicker.

Invasive species in the forest (weeds) and their removal.

FOREST LAW

General acquaintance with and working knowledge of the legal framework of managing the protection of forests and coverage of the following enactments & rules.

- The Orissa Forest Act,1972.
- The Odisha Forest (Detection, Enquiry & Disposal of Forest Offence) Rule,1980.
- The Odisha Timber and other Forest Produce Transit Rule,1980-In brief.
- The Odisha Forest Contract Rules,1966.
- Hammers Property hammer felling hammer T.P.U. hammer Released hammer Pass(Sold) hammer Seize hammer FGs Axe Cum hammer.
- The Odisha Kenduleaf (Control of Trade) Act, 1961 and Rules made there under.
- The Odisha Forest Produce (Control of Trade) Act, 1981 and Rules made.
- The Odisha saw Mills & saw pits (control) Act, 1990.
- The Wild Life (Protection) Act, 1972 and Rules made there under.
- Forest Conservation Act, 1980 and Forest (Conservation) Rules.
- Elementary Knowledge on labour laws.
- National Rule Employment Guarantee Act(NREGA),2005.
- ST and other Traditional Forest Dwellers (Recognition of Forest Rights), Act, 2006 and Rules there under,2007.
- Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989.
- Right to Information Act, 2005.
- Building and other Construction Workers (Regulation of Employees & Conditions of Service) Act-1996.
- JFM Resolution,2011.

WILDLIFE MANAGEMENT

Chapter-I : Definition of wildlife; Brief idea about wild fauna of our state.

Chapter-II : (a) Importance and values of wildlife;

(b) Ecosystem services;

(c) Stability and productivity of eco systems;

Chapter-III: Management of wildlife: Principles and field techniques.

(a) Census techniques.

(b) Habitat, Corridor, Habitat monitoring and improvement, Corridor protection, Geneflow among populations.

(c) Monitoring techniques for large herbivores and carnivores with emphasis on Sepsis of regional importance.

(d) Tranquilization techniques; translocation of animals.

(e) Damages caused by wildlife, man-animal conflict, control measures (Elephant, Bear, Monkeys, Panther).

(f) Animal Migration, migratory birds, breeding seasons; habitats of important birds and animals.

(g) Evidences of prevalence of wild animals.

- Foot prints of animals with paws, pugmarks, animals with hooves, bird tracks, preparation of foot print traces and preparation of plaster casts.
- Feeding signs of kills, recognizing kills made by tiger.
- Dropping and pellets.

Chapter-IV: (A) Management of specific animals (brief outlines only)

(a) Tiger, Leopard, Wild dog.

(b) Bear

(c) Elephant, Gant, Wild Buffalo

(d) Deer and Antelopes.

(B) Threatened species on Odisha, Such as Tiger, Leopard, Elephant, Four Horned Antelope, Black buck, Great Indian Horn Bill, Wild Buffalo, Gant, Crocodilians, Python, Pangolin, Wild Birds, Olive Ridley Turtle, Peacock.

Chapter-V: Definition: Sanctuaries, National Park, Biosphere reserve, community reserved conservation reserves, wildlife week , zoo, safari park, Tiger reserves, elephant reserves, World Heritage sites(WHS), salt licks, water Holes.

Chapter-VI: Brief idea on National parks and Sanctuaries in Odisha and their management focus; Eco-Development and Eco-tourism.

Chapter-VII: (a) National Tiger conservation Authority.

(b) Project Elephant.

(c) Captive breeding, Rear and release technique

- Crocodile breeding.

(d) Issue in protection of Olive Ridley Turtles.

ACCOUNTS AND PROCEDURE

- Basic principles of maintain 'Cash Account' and Forest Produce Account' in Forest ranges/ divisions.
- Procedure of handing over and taking over charges of a Beat.
- Payment vouchers- Muster roll- Measurement books- register of sanctioned works completion report.
- Odisha leave Rules- Earned Leave, Casual Leave, Leave Without Pay, Half Pay Leave, Commuted Leave.
- Travelling Allowance Rules, Preparation of T.A. Bills and T.T.A. Bills.
- Joining time.
- Manual Form No. 2,3,4 and 12.
  - Submission of tour diaries and tour particulars.
- Maintenance of consumable Store Register, Register of Stores, Tools and plants, writing off unserviceable stores.
- Financial procedure for implementation of JFM micro-plans/Schemes funded through FDAs.

ENVIRONMENT CONSERVATION

1. Environment, Biosphere, Ecosystem, Ecosystem Services, Anthropogenic, Pressure, Human footprint.

2. Biodiversity.

   a) Biodiversity- Definition, levels of biodiversity.

   b) Various Biodiversity conservator measures.

3. Soil and Moisture Conservation.

   a) Causes of soil erosion

   b) Injurious effects of soil erosion

   c) Podu cultivation and its prevention

   d) Remedial measures (vegetative process in detail).

   e) Method of conservation of surface water flow and ground water.

4. Watershed Management, Catchment area treatment.

a) Watershed development, extent and size of watershed and its influence on local vegetation.

b) Causes of water shed deterioration.

c) Principles of watershed management (objectives, watershed development, watershed survey)

5. Eco-tourism, Eco-development concepts and practices .

6. a) Water and Air Pollution.

   b) Waste disposal

7. a) Global warming and climate change

   b) Forest as a carbon sink.

      Carbon sequestration and storage,

      Forestry as a potential climate change mitigation measure.

FOREST MANAGEMENT

1. Introduction to the principles of Forest Management.
2. Concepts of sustained yield and sustainable forest management.
3. Measurement of growth, annual increment, of a forest stand.
4. Marking of trees for removal.
   - Principles of marking
   - Rotation
   - Yield regulation
5. Introduction to forest compartments, working circles, felling series, planting series, and Working Plans.

   Preparation of Working Plans- Basic ideas of growing stock estimation, regeneration survey, crop density, canopy manipulation.

FOREST PROTECTION

1. Susceptibility of Forests to Damage.

   Preliminaries involved.
2. Nature of Damages, Causes of Damage, Prevention, Combative and Remedial Measures:
   (a) Human Agency- unauthorized felling, encroachment, poaching etc.
   (b) Fire-causes, effects on different species, fire lines, controlled fire and counter fire.
   (c) Plants other that fungi, i.e. weeds, climbers, epiphytes, parasites.
   (d) Animals other than insects-
      i) Domestic animals-rotational and controlled grazing
      ii) Wild animals including birds.
      iii) Protection against animals- physical, biological, social and management methods.
   (e) Atmospheric agencies- frost, hail, wind, drought, lightening, damages caused by insects, fungi and other pathogens and their control.

COMMUNICATION AND FOREST EXTENSION

1. Duties and responsibilities of Forest Guard in relation to the villagers in his jurisdiction.
2. Protection against illicit felling and illicit transport, maintenance of boundaries of Reserve Forest, Proposed Reserve Forest, Demarcated Protected Forest to reduce encroachment.
3. Forest fire:
    a) Causes, Types of forest fire, harmful and beneficial effects of forest fire.
    b) Control measure:
        Preventive measure-Fire line creation, early control burning
        Combative measures-watch towers, fire fighting
    c) Introduction to modern fire fightingequipments.
    d) Reporting of fire damage.
4. Protection against grazing:
    a) Effects of cattle grazing on forests.
    b) Preventive measure-Regulation, rotational grazing, fencing in regeneration areas.
    c) Thumbs rules relating to currying capacity of Forests for cattle grazing.
5. Protection against pest:-

Pests and diseases of forestry species- Symptoms, identification, use of pesticides/ fungicides and plant protection measure.

6. Protection against Wildlife.
7. Function of mobile squads and anti-smuggling squad in forest protection.
8. Human dimensions in Forest Management:
    a) Forest and various means of livelihood.
    b) Role of NGO in forest management.
    c) Relation of the Forest Department with village level Organization.
    d) Women and forest Resources Management and Utilization.
9. Participatory Forest Management:-
    a) Need for role of community in forest regeneration and protection.
    b) Peoples' participation with special reference to JFM practices in Odisha
    c) Joint Forest Management Resolution,2008 of Govt. of Odisha.

d) Techniques for collection of data for preparation of micro plan by involving people through PRA and PRA.

10. Role of NREGS in motivation of people for forest protection.

COMPUTER & GIS APPLICATIONS

i. Introducing Computer Systems.

a) Computer Applications.

b) Generation of Computer.

c) Computer Systems.

d) Benefits and Limitations of Computers.

ii. Components of a PC System.

a. How does a computer Work?

b. Software.

c. Introducing Hardware.

iii. Introducing Classes of Portable Computers.

iv. Turning off your Computer.

v. Logging off

vi. Exploring Your Computer

vii. Managing the Control Panel

viii. Manipulating Folders and Files

ix. Managing Shortcuts

MICROSOFT WORD

a. Working with various Components of the Microsoft word environment.

b. Crate a Document.

c. Edit documents by locating and modifying text.

d. Format text and paragraphs.

e. Add tables to a document.

f. Add graphic elements to a document.

g. Proof documents to make them more accurate.

h. Control a document's page setup and its overall appearance.

MICROSOFT EXCEL

a. Work with an Excel worksheet by entering and selecting data in it.

b. Modify a worksheet by entering and selecting the data in it.

c. Format a worksheet.

d. Series

e. Define Function.

f. Perform calculation.

g. Print a workbook contents.

h. Create charts.

MICROSOFT POWER POINT

a. Work with PowerPoint Environment.

b. Crate a presentation.

c. Create a New Slide.

d. Slide layout.

e. Add tables to a presentation.

f. Add charts and picture to a presentation.

g. Side design.

h. Background.

i. Slide Effect.

j. Slide Transition.

k. Slide show

INTERNET

i. a. Evolution of the Internet.

b. World Wide Web.

c. Connecting to the Internet.

ii Introduction to the Browsers

a. Types of Web Browsers.

b. Components of Web Browsers.

iii. Introduction to Search Engines

a. Working of a search Engine.

b. Former Search Tools

c. Advance Search Techniques.

d. Receiving and sending Email

e. Downloading and uploading Text/Photo/ Video.

GIS

1. Geometrics- an overview
2. Introduction to Geographic Information System (GIS)
3. Introduction to map projections
4. Satellite Remote Sensing.
5. Global Positioning System (GIS)
6. Field date capture method
7. Digital Global Positioning System (DGPS)