# **PHYSICS - Syllabus (Practicals)**

Total Periods 60 (Section A)

#### Experiments

- 1. To find resistance of a given wire using metre bridge and hence determine the specific resistance of its material.
- 2. To determine resistance per cm of a given wire by plotting a graph of potential difference versus current.
- 3. To verify the laws of combination (series/parallel) of resistances using a metre bridge.
- 4. To compare the emf's of two given primary cells using potentiometer.
- 5. To determine the internal resistance of given primary cell using potentiometer.
- 6. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
- 7. To convert the given galvanometer (of known resistance of figure of merit) into an ammeter and voltmeter of desired range and to verify the same.
- 8. To find the frequency of the ac mains with a sonometer.

#### Activities

- 1. To measure the resistance and impedance of an inductor with or without iron core.
- 2. To measure resistance, voltage (ac/dc), current (ac) and check continuity of a given circuit using multimeter.
- 3. To assemble a household circuit comprising three bulbs, three (on/ off) switches, a fuse and a power source.
- 4. To assemble the components of a given electrical circuit.
- 5. To study the variation in potential drop with length of a wire for a steady current.
- 6. To draw the diagram of a given open circuit comprising at least a battery, resistor/rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

### EXPERIMENTS (Section B)

1. To find the value of v for different values of u in case of a concave mirror and to find the focal length.

- 2. To find the focal length of a convex mirror, using a convex lens.
- 3. To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and 1/v.
- 4. To find the focal length of a concave lens, using a convex lens.
- 5. To determine angle of minimum deviation for a given prism by plotting a graph between the angle of incidence and the angle of deviation.
- 6. To determine refractive index of a glass slab using a travelling microscope.
- 7. To find refractive index of a liquid by using (i) concave mirror, (ii) convex lens and plane mirror.
- 8. To draw the I-V characteristics curves of a p-n junction in forward bias and reverse bias.
- 9. To draw the characteristics curve of a zener diode and to determine its reverse break down voltage.
- 10. To study the characteristics of a common-emitter npn or pnp transistor and to find out the values of current and voltage gains.

#### Activities

- 1. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items.
- 2. Use of multimeter to (i) identify base of transistor, (ii) distinguish between npn and pnp type transistors, (iii) see the unidirectional flow of current in case of a diode and an LED, (iv) check whether a given electronic component (e.g. diode, transistor or IC) is in working order.
- 3. To study effect of intensity of light (by varying distance of the source) on an LDR.
- 4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
- 5. To observe polarization of light using two polaroids.
- 6. To observe diffraction of light due to a thin slit.
- To study the nature and size of the image formed by (i) convex lens (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
- 8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

# **Guidelines for Practical Physics**

As Physics is a basic science, Experimental Physics is highly significant in the higher secondary level. A minimum of 10 experiments must be performed by each student with at least one experiment from each of the following section.

Year	Section	Units as per	Minimum	Minimum
		NCERT Theory	No. of Expt.	Expts. to
		Text Book	to be performed	be performed
				in the year.
	1	1, 2	1	
	2	3, 4, 5, 6	1	10
First Year	3	7, 8	1	
	4	9, 10	1	
	5	11, 12, 13	1	

Students must be provided ample opportunities to be familiar with maximum number of apparatus and scientific principles through practical physics.

Performing experiments using same apparatus / principle and recording them as different experiments should be avoided. Eg. (i) Find the volume of given sphere using Vernier Calipers and (ii) Determine the density of rectangular block using Vernier Calipers can not be recorded as two separate experiments.

#### **Physics Practical Log Book**

The experiments performed by the student must be recorded in the log book. The student should be encouraged to draw the tabular column and write the aim, principle, and procedure of the experiment before performing the experiment in the lab and the certified logbook should be submitted for practical examination. A single logbook should be used for first and second year. A minimum of 22 experiments should be recorded in the practical log book.

#### **Higher Secondary Practical Examination**

An internal practical examination should be conducted at the end of HSE first year for a maximum 20 scores. Certified log book should be submitted

for this internal examination also. Duration of the examination is  $1\frac{1}{2}$  hrs. This score should be considered for second year CCE.

Sl No.	Item	Score
1.	Principle and theory	5
2	Setting up of apparatus	2
3	Performance of the experiment	6
4	Result in SI units/ conclusion	4
5	Ascertaining the awareness of concepts	1
6	Record	2
	Total marks for one Expt.	20

Score Distribution	Score	Dis	trib	ution
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Two experiments should be done at the time of practical board examination (One experiment fromPlus One and other from second year). The total marks for paractical board examination is 40.

# Scheme of work

Chapter	Month	Chapters	Periods	Weight of Score
1	June	Electric Charges and Fields	14	4
2	June July	Electrostatic Potentials and Capacitors	11	4
3	July	Current Electricity	22	6
4	August	Moving Charges and Magnetism	18	5
5	August	Magnetism and Matter	7	3
6	September	Electromagnetic Induction	8	3
7	October	Alternating Current	12	4
8	October	Electromagnetic Waves	4	2
9	October November	Ray Optics and Optical Instruments	20	7
10	November	Wave Optics	10	4
11	November	Dual Nature of Matter and Radiation	8	3
12	December	Atoms	8	3
13	December	Nuclei	10	4
14	January	Semiconductor Electronics: Materials, Devices and Simple Circuits	18	5
15	January	Communication Systems	10	3
Total			180	60
	February	Revision		

## **Physics Practicals**

Term	Units	Experiments	Periods	Remarks
1	Current Electricity Moving Charges and Magnetism Magnetism and Matter Alternating Current	Experiments 1 to 8 (From Section A)	30	Any 12 Experiments
2	Ray Optics and Optical Instruments Semiconductor Electronics: Materials, Devices and Simple Circuits	Experiments 1 to 10 (From Section B)	30	from both Section A and Section B
3	Model Practical Exam			

Note:

- 1. A minimum of 10 experiments should be done from Plus1 Practicals and an internal Practical Examination should be conducted at the end of First year course.
- 2. A minimum of 22(10+12) Experiments should be done from both Plus1 and Plus2 Practicals.

# **PRACTICAL EVALUATION**

# Social Work Lab

The scientific and professional characteristics of social work make it imperative to have 'practical' a dynamic component of its learning strategy. The theoretical inputs regarding social dynamism, various social work methods, therapeutic strategies, etc. will be exposed to the learner in live situations. Due weightages are given in the distribution of scores while evaluating the learner.

## Guidelines

- Social awareness and community sensitization must be part of practical learning.
- Organization and agencies chosen for exposure visit and study must be socially acceptable and 50% of it must be professionally managed.
- Due care must be given to familiarize various methods of social work through the selection of such agencies.
- Action or extension programme chosen must provide room for learners to plan, organize and implement the activities.
- The staff guide must facilitate the conduct of the exposure visits concurrently or together as a block.
- Except the exposure visits, any one of the component of the field work should be done during the first year.
- The learners must be oriented in writing practical records, case study reports, and other relevant end products.
- Resource mobilization and budgeting for the practical projects must be in consultation with the class PTA on a democratic basis.

- An exposure visit itinerancy must be prepared involving the learners and this must be given to the parents. The consent of the parents must be obtained in writing. Agencies of visit, place of stay etc. must be mentioned in the consent letter.
- The presence of lady teachers must be ensured while taking the students for exposure visit. Mother PTA representatives can also be included in the absence of lady teachers.
- Students in groups should be involved in planning, organizing, implementing and evaluating the field exposure programme.
- End products like field visit records, action programme report, resource map, case study report, photographs etc. must be made for each corresponding programme and this must be made available for evaluation.

## **Components of Social Work Lab**

### A. Exposure Visit

A minimum of four exposure visits should be conducted. This visits can be to social welfare agencies, communities, correctional institutions, social action centres, etc. Of these four visits, two must be centres where professionally qualified social workers are employed. The learners should be facilitated to gain inputs on the history, objectives, programmes, organizational structure, methods of social work used and challenges of the agencies.

The end product of this practical component will be a record of the report of each corresponding visits. Each report should contain a minimum of four pages and should not exceed seven pages. The score for exposure visits is 20.

#### b. Micro Research or Case Study

Learners in convenient groups should be facilitated to undertake a small research work or a case study. This must be on any socially relevant issues like alcoholism, use of tobacco, mobile misuse, erroneous, study habits etc. Through this practical component, the students should be familiarized on the various essential steps of scientific research methodology and sensitized on a socially relevant issue which demands social work intervention.

The product of this practical component will be a study report not exceeding ten pages compressing the title, subjective, methodology, data analysis and interpretation. The case study report must contain the profile of the case, problems, diagnosis and suggestions. It should not exceed seven pages. The score for micro research or case study is 5.

#### c. Extension or Action Programme

Extension, today is recognized as the third dimension of education. In social work education, extension provides ample opportunities to the learner to relate with the immediate community and intervene in socially relevant issues. The students can organize any action programme or extension activity like prominent day observations (environment day, geriatric day, poverty day, population day, human rights day, etc.) or organize community linked programme of issues like environment protection, water literacy, hygiene, organic farming, self-help groups etc. the students should be helped to given experience in planning, organizing, implementing and evaluating the programme.

The product of the component will be a report on the process and programme. It should not exceed five pages. The score is 5.

## d. Social Group work

The students are facilitated to form various groups to fulfil certain developmental needs of the school/class. (Eg. Organise a career exhibition, health programme, waste management, etc.). The teacher facilitates the learner to identify suitable issues, help them to form group according to their interest, plan, organize and evaluate activities. Through this the learners are helped to observe the stages of group formation and the dynamics involved in its functioning. The product of this component is a report containing the process and dynamics of group formation and programme implementation. The report should not exceed five pages. The score is 5.

#### **Evaluation of Practical Work**

Viva voce and rapid appraisal tests are the tools for practical evaluation. This will be conducted by an external examiner with the support of the staff guide. Each learner will be personally interviewed by the external examiner. The learner should be facilitated to express his/her understanding on the scientific knowledge base of social work and the experience gained through other practical components.

The rapid appraisal test will help the external examiner to assess the knowledge, experience and skill gained by the learner. Besides, short objective type questions, the external examiner can assess the experience and skill gained by the learner through various other strategies. The learners can be asked to prepare resource maps, developmental projects, venn diagrams, problem trees, etc.

Though viva voce and rapid appraisal tests are practical evaluation tools, the range in individual performance levels (clarity, assertiveness, communication, ...) should be measured providing a maximum score of 5.

# **Guidelines for Practical Evaluation - Statistics**

The subject statistics has a wide range of practical application in all walks of life.Use of proper data and its analysis are very importance.In the present scenario of outcome based approach, the learning activities should go hand in hand with the related practical situations. Now a day's almost all data analysis can be successfully done using computers.

The guidelines for conducting practical examination for higher secondary STATISTICS are given below in detail.

There will be Practical Evaluation only for second year students ,but the portions from first year also included in examination .Teachers can conduct lab works in first year itself (if needed),but the final assessment will be done only at the end of second year.

Maximum Score : 40

Maximum time allowed: 3 hrs.

# **Topics for PE**

1.	Diagrams and graphs	Simple Bar diagram, Multiple bar diagram, Sub divided bar diagram, Percentage bar diagram, pie diagram, Histogram, Scatter diagram, Control charts using line charts(SQC).
2.	Descriptive statistics	Construction of frequency table, Mean, median, mode, quartiles, skewness, kurtosis. Normal probability,Poisson probability , binomial probability
3.	Correlation and Regression	Karl Pearson's coefficient of correlation, Regression equations, Forecasting using Regression equations, Trend line fitting (straight line), Estimation of trend values, moving averages.
4	Testing of Hypothesis	Z test - two sample for means, Ftest – ANOVA one variable, Chi square test for independence.

# **Evaluation Process**

The question paper contains four sections related to the topics given above which will be supplied by DHSE to the external examiner. Each section carries 4 questions. External examiner can prepare question paperconsists of four questions. External examiner should ensure that there is one question from each section. Change of question paper may be allowed with a penalty of 2 scores for each change.

	- Total		40 scores
Content awareness/Viva voce			4 scores
Record work.			4 scores
Each question carries 8 scores. 8x			32 scores

#### Score distribution for each question:

1.	Identifying the questions		1
2.	Data entry		2
3.	Selecting appropriate statistical tool		2
4.	Processing the data		2
5.	Interpretation of the result/conclusion	۱	1

Total Scores	 8

\*\*\* All the problems should be done using computer

# For practical examination

- Computerized procedure
- Output of the problem
- Inference

# **Contents of Record**

\*Different types of problems from the PE topics cited above.

#### Diagrams and graphs 1

	8 problems		
Control charts	- one problem		
Scatter diagram	- one problem		
Histogram	- one problem		
Pie diagram	- one problem		
Percentage bar diagram	- one problem		
Sub divided bar diagram	- one problem		
Multiple bar diagram	- one problem		
Simple Bar diagram	- one problem		

#### Descriptive statistics 2

	5 problems
Binomial probability	- one problem
Poisson probability	- one problem
Normal probability	- one problem
Mean, median, mode, quartiles, skewness, kurtosi	s one problem
Construction of frequency table	- one problem

#### **Correlation and Regression** 3

—	8 problems
Moving averages	- two problems (odd,even cases)
Estimation of trend values	- one problem
Trend line fitting (straight line)	- one problem
Forecasting using Regression equations	- one problem
Regression equations	- Two problems (Yon X and XonY)
Karl Pearson's coefficient of correlation	- one problem

#### **Testing of Hypothesis** 4

Z test - two samples for means		- two problems
		(Population SD known & unknown)
F test – ANOVA one variable		- two problems (Row and Column)
Chi square test for independence		- one problem
		5 problems
Total 26 problems		
Structure of Record:		
• Aim	: The objective of the problem.	
Principle	: Theory of the problem.	
Computational procedure	: The PATH for solving the problem using computer.	

- : Computer printout or manual write up.
- Data analysis Inference •
- : Interpretation / conclusion.

#### Reference

Statistics made simple do it yourself on PC, by K.V.S.Sarma, Prentice- Hall of India Pvt. Ltd. Any book related to these areas.