Skill Development Courses in Physics

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Abstract- *Physics itself covers a broad area in academics and science, so the subject itself is having big opportunities to start the skill development courses related with the different fields in physics. Moreover, the student's interest plays a crucial role and need to be considered while offering the skill development course to the students. In this paper, I have discussed the skills gained by the students during the learning of basics of physics including experimental physics and the probable startup of skill development courses accordingly. I have explained the importance of different stages like title of the course, designing of curriculum of the skill development course, importance of skill development in applications of the course and placements and also missing part from the current theoretical syllabus which plays the crucial role in achieving the skills. I also have explained some new skill development courses. The significant possible skills are discussed in the paper for the students. This paper will be helpful to start the skill development courses for the physics students for their future scope in the current scenario as per the guidelines of national education policy for the student's benefits.*

Keywords: Physics, Skill Development, Education, Student interests, Future scope

Introduction

Physics is an important subject in research. Physics is generally called as mother of science and mathematics as father of science. It is necessary to grow the culture of science in order to develop the Nation. The basic aim of the subject is to motivate the students for theoretical and experimental research with conceptual understanding. Moreover, it is observed that all students are not interested to do research, as a future career. So, it is necessary to enhance the theoretical and experimental skills of the students not only for research but with all possible angles and provide them the opportunities and open doors in diverse fields to set and achieve the different skill oriented goals in their future career. National education policy expects the enhancement in the skills in each subject for the benefit of students in student oriented education system. As per the need of the policy and the current scenario in academic system, it becomes an urgent need to search the skill enhanced courses in Basic and Applied Physics.

Objectives

The main role is in the designing of curriculum for skill development courses is its syllabus, so that students can actually gain the skills and can utilize the outcome in their future career.

Hypothesis

It is necessary to observe and analyze the need of the required skills and human values for the community related with physics. Once the requirement is understood, accordingly the skill oriented courses related with physics could be designed for the students. The government startup grant also needs to be considered, so that the skilled students can also start their own industries and business. As Physics is generally differentiated into Basic Physics and Experimental Physics, accordingly one can discuss the required skills and earned skills by the students during learning of these courses.

Methods and Procedure

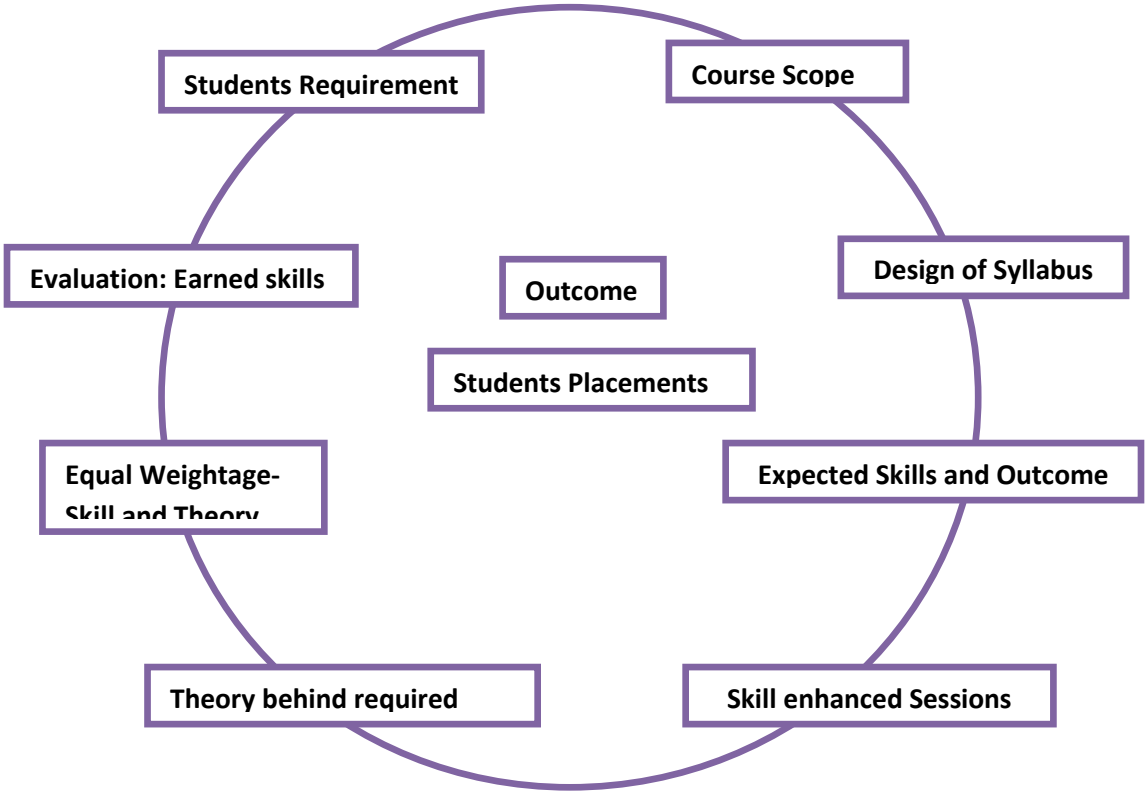
The following steps are important and need to be considered them to start the new skill development courses in coming era of academic system for fruitful outcome.

Title of Course: The course title should be attractive and it should reflect the outcome of the course so that maximum students can join the course and take benefits from it. The title should not be broad but specific. It should be related with the basic course in physics or applied physics. Title itself reflects the skill based job opportunities in the recent upcoming.

Designing of Curriculum:

It is necessary to look towards the expected skills of the students at first as a course outcome and accordingly the syllabus of the practical's or skill gaining activities is to be decided. This will help to decide the syllabus of the theory for the same course according to the need of the skills. The percentage to the syllabus should be designed in such a way that it includes 50% to 60% percent part is of skill learning oriented and the remaining 50% to 40% is of theory oriented. This care while designing curriculum is required so that students can actually spend more time to learn skills. The included theory part definitely helps the students to learn theory behind the skills and also inspire them to create innovative equipment's to fulfill the requirement. Evaluation should be based on the earned skills and the outcome of the course is measured with respect to the student's placements and help of skill development course for the placements of the students.

Steps involved in designing of syllabus (Flowchart):



Result and Discussion

What is missing?

It is necessary to discuss with the pass out students and ask the questions and store it as question bank. The overview about what they think gives an idea about the need of extra skills. This will definitely help in designing curriculum and title of the skill development course in Physics. The discussion with the new enrolled students will also help to look towards the student's interest and design the course and its syllabus as per the need, according to flexibility given to autonomous colleges.

Placement and Applications:

Physics students has enormous opportunities in thin film industries, coating industries, materials and nanomaterial synthesis laboratories, hospitals, metallurgy departments, Laser and Technology, Calibration industries, semiconductor industries, vacuum industries, advance technologies like scanning probe microscopy, atomic force microscopy, X rays and UV technologies. The students of physics are also having scope in Astrology and cosmology. Besides, physics students are having scope in different ongoing research institutes like LIGO and in defense institutes and industries.

Use of Skills in Future life: Sometimes the skill learned by the students not only helps to gain the jobs but that can be also helping them in future life wherever the understanding part is

required. For example, the knowledge and skill of star gauzing and eclipses gained by the students is helpful at the time of eclipses and during star gauzing.

The skill of star gauzing also helps to gain the jobs e.g. the skilled students could become good demonstrator and organize the workshops, summer schools on star gauzing part. The skilled students can also carry these hobbies ahead and search new stars and gain some advance knowledge. The skilled students can gain the skills of lens making and can also construct the spectacular lens of different focal lengths and start the small scale industries for the same.

Courses that can be started:

Advance Optometry: The students can learn the construction of lenses and also the physics behind it. They can learn the grinding of glass and construction of the telescope.

Solar Energies/ Energy Studies: Different types of energies, solar energy and renewable energy sources, non-renewable energy sources can be studied by the students. As, India is a country where lot of solar power is available, students can construct the different equipment's like solar charger, solar cooker, solar water heater, solar wall for electricity generation etc. The equipment's made up with good efficiency can be utilized on large scale and skilled students can start a business of the same.

Biomedical Instrumentation and Radiology: The physics students can gain the knowledge of biomedical instrumentation and also gain the skills of operations for the different instruments like Electrocardiogram (ECG), Electroencephalogram (EEG), Electrooculogram (EOG) Computed Tomography (CT) scan and Magnetic Resonance Imagining (MRI) etc an important tool that requires proper operational skills.

Non-Destructive Testing Techniques: The different techniques like measurement of different physical parameters related with the measurements of elastic modulus can be developed. LASER technology is utilized now a day in various fields and can be used to start the related course. The course like Remote Sensing can be developed with the help and syllabus of different kinds of sensors.

Software Industries: In current decade the software industries have become an attractive field. Physics students having basic understanding of computer software's can learn the different courses like R software, Python and after gaining the skills they can join the jobs in Data Science and Artificial Intelligence, as lakhs of job opportunities are expected in this fields recently.

How to develop the proposed skills:

The development of skills of Advance Optometry and Solar Energies are possible through the organization of different workshops under the guidance of trained and qualified staff. The biomedical skills will be developed through demonstrations and hands on training sessions. Students will learn to collect and analyze the data about system using the electromagnetic radiation, sound wave etc. to develop Non-Destructive Testing skills. The demonstrations and

practice sessions on software's like python can be arranged for the problem solving. To develop proposed skills, students have to learn consistently with the help of well equipped laboratories and industries for the hands on training sessions, till they are not satisfied and confident.

Conclusion

National education Policy gives an opportunity to the students of physics to learn the skill development course. The student will definitely learn new skills and can utilize the skills in future in terms of jobs, soft skills, start-ups, business, research or as hobbies for their own satisfaction. The enrollment of skill development course also motivate to the teachers to teach subjects with different approach, design the curriculum and implement it in the stipulated time. To start the innovative skill development courses in Physics for the students is also a big challenge in front of the teachers to fulfill the student satisfaction. This new experimentation and enrollment of skill development course is helpful for the conceptual understanding as well as for the outside box thinking and surely, it opens the doors for the students for various fields along with the traditional career opportunities in Physics.

Reference

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