

OUR EXPERIMENT WITH M. PHIL PROGRAMME

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M Phil was introduced in most of the Universities around 1975; almost at the same time as ULP-COSIP projects were introduced to bring innovative changes in science education in India. The obvious purpose was to prepare a well equipped cadre of college teachers who can implement the new programmes for re-orientation of science education as envisaged by educational planners of our country. A significant role was played by Professor Rais Ahmed, Ex. Vice-Chairman of UGC, in formulating these programmes.

We started our M Phil programme in 1983 under the pressure of college teachers who were obliged to obtain this degree to earn their annual increments. Being a new department, our faculty was not mature enough to run this programme. However, we took the initiative and collected all relevant information from our neighbouring universities. University Grants Commission, when approached, did not render any help. We were surprised that there was no coherence in M Phil programmes run by various universities. We found many different approaches being adopted for training of M Phil students during a two semester course. While in the initial stages, Punjabi University, Patiala laid more stress on laboratory work along with a strong dose of theory courses and research project, University of Roorkee introduced different M Phil courses to cater to the needs of each specialised area of research. Still others were running M Phil on the basis of theory courses alone

without any research component. Evidently, in all programmes the missing component was training for Physics Education.

Our programme has all the three components—theory courses, laboratory practice and a research project. However, our approach is entirely different. We lay more stress on conceptual teaching of physics during the first semester. The curriculum does not lay emphasis on formal class room teaching as at M. Sc. level. Our philosophy is to teach physics through some basic concepts, viz. space, time, matter and motion. In reality, the entire edifice of physics can be regarded simply as the evolutionary transformation of these four basic concepts. For a comprehensive survey, one has to start with Aristotlean physics, deep into Newtonian era and conclude with Einstein's relativisation of these basic concepts. History and Philosophy of Physics form an essential component of our M. Phil course to trace the development of these concepts over the centuries. M Phil students have to be convinced that physics is not a mere jugglery with mathematical symbols but an independent discipline with its own cultural moorings. Mathematics is the language of physics but not an-end all and be-all of physics. A separate course 'Mathematical Methods of Physics' at M Phil level takes care of this aspect.

In addition to these four basic concepts, other concepts which have become central to the development of physics are

also introduced, e.g. concept of ether, entropy, force, field, wave and quanta, symmetry, conservation laws and unification of fundamental forces. Our main problem is that there is no text book of physics which gives a comprehensive account of all these concepts. As there is a lot of abstraction involved in these concepts, students find it difficult to grasp it in the beginning but after reading some books¹⁻³ on history and philosophy of science they develop a taste for this approach.

After coverage of the basic concepts, M Phil students are required to undergo teaching practice. They are assigned topics of their choice and asked to teach B. Sc. (Hons.) students. Their performance is tasted by encouraging the B. Sc. students to ask questions and then evaluate M Phil students teachers against performance of their class teacher. M. Phil students are assigned laboratory duties also. They supervise the performance of students and try to introduce new techniques for improvement of laboratory work. There is no written examination. At the end of the semester, the student appears for his viva voce examination before a board of examiners. Most important consideration is the grasp of basic concepts and underlying principles rather than crammed knowledge of definitions, statement of laws and their derivation. We have no hesitation in admitting that only a few students have come up to our expectations so far.

During second semester, M Phil students are allotted research projects in the area of their choice. Although there is provision of research projects in the area of teaching of physics, very few students opt for this. There is one self-study paper for each specialised area relevant to the research project of the student. There are no special requirements for the research project. The only aim is to train the students in research methodology and survey of literature so that they may opt Ph. D. programme at a latter stage.

As per UGC guidelines, the minimum qualification for recruitment of college lecturers is again reduced to M Sc degree. Hence, M. Phil degree may become redundant unless its aims and objectives are clearly defined in view of new education policy being adopted in India. We are convinced that those who opt for teaching career in a college would benefit best from a M Phil programme different from that required for those who opt for advanced research as their future career.

References :

- 1 M Capek : The philosophical impact of contemporary Physics. Van Nostrand Reinhold Co. New York, 1961.
- 2 William Dampier : A history of Science and its relation with Philosophy & Religion. Cambridge University Press, 1966.
- 3 Leon N Cooper : An introduction to the Meaning and Structure of Physics. Harper and Row, New York, 1969.

