

CONTENTS OF THE COURSES IN PHYSICS IN THE SOFIA UNIVERSITY

(1889 - 1945)

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The lecture courses in physics are an important part of the history of the university education in physics in Bulgaria. Courses in general physics, analytical mechanics, astronomy, meteorology, technical, nuclear and mathematical physics are created after 1889. Till 1945 lectures in physics are read only by the Faculty of Physics and Mathematics at the University of Sofia.

INTRODUCTION

"Physics" as a notion enters the Bulgarian literature with a margin note on a manuscript of Sophroni Vrachanski (ca. 1800) and in the "Fishy Primer" (1824) of P. Beron during the early Bulgarian National Revival. Later on special textbooks in physics are published by N. Gerov (1849), Y. Gruev (1869 and 1872), I. Gyuzelev (1874), in astronomy by D. Enchev (1873), D. Vitanov (1875), and in geography by I. Bogorov (1842), and others. The university courses in physics, read by the Faculty of Physics and Mathematics at the University of Sofia since 1889, are the part of the history of physics in Bulgaria. [1] Courses in general physics, analytical mechanics, astronomy, meteorology, technical, nuclear and mathematical physics are introduced there up to the end of the World War II. This work aims to show the contents of our university courses in physics before 1945. Curricula [2] and archives [3] of the Faculty of Physics and Mathematics of the Sofia University are used as sources.

1. EXPERIMENTAL PHYSICS

The course in experimental physics is the first Bulgarian university course in physics. A short course in experimental physics for related faculties is introduced too. The first who read experimental physics in the Sofia University is E. Ivanow (1889/90). In 1890 P. Bachmetjew is appointed lecturer in "experimental physics" in the Faculty of Physics and Mathematics and reads the course in general physics till 1906. Six years (1892/3-1897/8) he shared the course with M. Batchevarow. A manuscript of the lectures of P. Bachmetjew and M. Batchevarow from 1894/5-1895/6 is preserved. It includes "measuring instruments", "absolute units of measurement", "CGS system", "mechanics", "acoustics", "heat", "optics", "electricity and magnetism", "addition to electrical waves", and "practical part" about electrical apparatus modern at that time. Additional course in "measurement methods" is read by P. Bachmetjew in 1898/9. The lectures in experimental physics read by A. Christoff, the successor of P. Bachmetjew, does not contain practical applications. P. Pentchew reads the course in

"measurement units and methods" at that time (1919/20-1937/8). Since 1937 the main course in experimental physics is read by G. Nadjakoff. In his lectures G. Nadjakoff demonstrates the physical laws in two ways - from the experimental and from the theoretical point of view. The following items are added by him at the beginning of the lectures: "measurement physics and generally about the methods of measuring, measuring mistakes, absolute mistake, how to write the measuring or calculation results taking account of the accuracy of measuring, the least squares theory, how measuring mistakes reflect on all the measured quantities, approximate methods of calculations, ways to present the measuring results, measuring methods". [4]

2. TECHNICAL PHYSIC

Two courses in technical physics can be identified in the curricula of the Sofia University before 1945. We consider the course in measurement methods of P. Bachmetjew as a predecessor. The second course in technical physics is initiated by P. Bachmetjew in 1902/3-1903/4. It is called "applications of electricity". This course is read two hours a week during two semesters. The law of 1904 makes a provision for a creation of a chair of industrial physics in the framework of a new specially created technical department, but this is not realized before the end of the period. In 1935/6 G. Nadjakoff renews the course under the name "physics basis of electrical engineering". From 1939 the course is read by E. Djakow, elected lecturer in the chair of experimental physics and meteorology. He named the course "technical physics".

3. RADIOACTIVITY

The first course in nuclear physics in the Sofia University is "electrical phenomena in gases with radioactivity" read by P. Pentchew (1919/20-1937/8). In 1939 E. Kara-Michailova is elected lecturer in special physics. She reads the course in "experimental atomistics with radioactivity" since 1939/40. Courses in "spectrum analysis" (1941/2-1944/5) and "luminescence and conductivity in solids" (1942/3) are introduced by her. The lectures in "Experimental atomistics with radioactivity" by E. Kara-Michailova are published in 1943. The following items are examined: "gases conductivity and ionization", "ionization current", "ionization method for intensity measurement of corpuscular and wave radiation", "the Wilson camera", "stressed ionization", "theory of Thausend", "independent discharge", "crown discharge", "counter", "smoulder discharge", "voltaic arcs", "electrical figures", "sparkles".

4. METEOROLOGY

The meteorology and experimental physics in the Sofia University are separated as chairs after 1945. The first course in "meteorology" is read by M. Batchevarov during the period 1898/9-1905/6. Since 1920/1 R. Rainoff reads meteorology. He introduces several new courses in: "atmospheric dynamics, optics, acoustics and electricity" (1921/2-1944/5), "meteorological and climatic conditions in Bulgaria" (1921/2-1944/5), "practical meteorology" (1921/2) and "meteorological instruments" (1923/4). Course in "meteorology and climatology" (1923/4-1944/5) for the "related" faculties and a course in "seismic waves" (1930/1-1934/5), later on called "geophysics" (1935/6-1944/5) are introduced by him too. The lectures in "Meteorology" for students of the related faculties are published by R. Rainoff in 1935. The following items are examined by him: "atmosphere", "radiating energy in the atmosphere and on the ground", "temperature conditions on the ground and in the soil", "temperature conditions in low air stratum", "temperature conditions in the high atmosphere stratum", "atmospheric steam condensations", "rainfall (humidity)", "atmospheric pressure", "winds", "synoptic meteorology", "volumetric phenomena of cyclone, anticyclone and intermediate atmospheric conditions", "weather forecasting", "climatology".

5. ASTRONOMY

The astronomy is an independent theoretical science in the Faculty of Physics and Mathematics at the Sofia University from 1892. The first course in astronomy is read by M. Batchevarov since the second semester of 1891/2. The manuscript of his lectures of 1894/5 is preserved. The first part of it, "spherical astronomy", contains: co-ordinate systems, constellations, atmospheric refraction, parallax, aberration, precession, nutation, azimuth. The second part "planets" includes: motion, Ptolemaeus and Kopernikus systems, Kepler's laws, asteroids, satellites, comets, Moon and eclipses. In the third part "celestial mechanics", "differential equations of planet's motion, perturbations of elliptic motion, calculus of the masses of the Solar system bodies, weight on the surface of the bodies of the Solar system, a centrifugal force, flattening in the Solar system bodies, center of gravity of the Solar system, and inequalities in the Moon's motion" are examined. After 1897 the course in astronomy is divided into: "spherical astronomy", "practical astronomy", "celestial mechanics" and "astrophysics". In 1904 they are combined in "spherical and practical astronomy" and "theoretical astronomy" (celestial mechanics). Since 1928 N. Boneff reads the courses in astronomy without the practical aspects. A new course in "geodesy" is introduced by him in 1931. In 1940/1 it is replaced by another course in "higher geodesy". Courses in "geodesy", "higher geodesy", and "drawing of plans" (1935/6) are read for the related faculties. The

lectures in spherical astronomy by N. Boneff are published in 1940. Supplements in "spherical trigonometry", "interpolation" and "theory of the least squares" are included in them.

6. ANALYTICAL MECHANICS AND THEORETICAL PHYSICS

The first course in analytical mechanics in the Sofia University is read by M. Momtchilow (1891/2). Later on the main course in analytical mechanics (1893/4-1909/10) and a number of new courses in: "mathematical theory of heat" (1897/8), "thermodynamics" (1904/5), "mechanics of the systems" (1901/2), "dynamic equations and theory of the gravity" (1906/7), and "theory of Newton's potential" (1908/9) are read by S. Ganew. In 1914 I. Tzenoff is elected lecturer in analytical mechanics in the Sofia University. His lectures in "Analytical mechanics" are published in 1923-1924. The course begins with "theory of vectors". An independent course in "vector calculus" is read by G. Maneff from 1923/4 till 1943/4. In 1934 it is published as "Introduction in the vector calculus with applications and problems". The first course in theoretical physics in the Sofia University is read since 1921/2 by G. Maneff. He reads also some new theoretical courses in "theory of relativity" (1922/3), "quantum theory" (1931/2), "basis of the quantum mechanics" (1933/4), "statistical mechanics" (1935/6), "electronic theory" (1936/7-1938/9), "heat radiation, atomic and quantum theory" (1939/40). The lectures in theoretical physics are published by G. Maneff in two parts during 1938 and 1940.

CONCLUSIONS

More than thirty lecture courses in physics are read in the Faculty of Physics and Mathematics at the Sofia University before the end of the World War II. The experimental courses in general (experimental) physics, meteorology, technical and nuclear physics are read by lecturers from the Chair of Experimental Physics and Meteorology. Theoretical courses in mathematical physics, astronomy, and analytical mechanics are read by lecturers from the three other independent (theoretical) chairs.

References

- [1] Белсжити български физици. (ред. П. Симова), София, 1981
- [2] Разпис на лекциите за зимно/лятно полугодие 1897/8 ... 1949/50, Университет в София, Държавна печатница ..., София, 1897 ... 1950 [НБКМ, НБИВ, БСУ]
- [3] СГОДА, ф. 994 к, оп. 13, а.е. 12-19, 27-29
- [4] Наджаков, Г. Опитна физика. София, СУ, 1947

This work is partially financed by the National Science Foundation by the project F-517