

GEOLOGICAL PROSPECTING IN BULGARIA

Geology is a science about the composition, structure and history of the Earth. It became a separate branch of the natural science in the second half of the XVIIIth century and the beginning of the XIXth century. In the beginning research was mainly related to description of the rocks, mineral resources and their distribution in the Earth's core. In XIXth and especially in the beginning of XXth century geological knowledge increased to such an extent that it required the separation of the geological science into interrelated and interdependent sciences and scientific disciplines. Geology evolved from descriptive into analytic science which can foresee phenomena and processes and can draw up the perspectives for the existence of mineral resources.

Geological prospecting as applied aspect of geological research is a complex of geological, geophysical, geochemical, metallogenic, drilling and other types of research of the mineral resources' deposits. In addition, geophysical prospecting is carried out before the construction of all industrial and civil facilities, in archeology, etc. Geophysical prospecting is directly related to the sciences and scientific disciplines which study the composition, structure, forces and processes in the Earth's core and the Earth.

Geological research in Bulgaria

Starting stage of the geological research in Bulgaria. The increasing demand about raw materials combined with the quickly developing industry in Europe focused the interest on the relatively unknown Balkan territories. Best known among the establishers of geophysical prospecting is the French scientist Ami Boúe (1794-1881). He studied the geology of the Balkan countries for several years which was reflected in the first geological article about "The Balkan peninsula and Bulgaria" printed in 1828 and the essay "European Turkey" published in French in 1840. In the chapter "Geological layout of European Turkey" the author described the natural landmarks and wealth in the studied region. Another French scientists, Ogust Vikenel, together with the Austrian geologists F.Hohsteter and Fr.Toula, studied the geology of Bulgaria and published articles accompanied with geological layouts and maps of our territories. In 1870 F.Hohsteter published the first geologic map in scale 1:3 000 000 covering the eastern part of the Balkan Peninsula. In the period before and after the Liberation (1878) the Bulgarian lands were also studied by the Austrian scientists K.Peters, Fr.Shtriekenstein and A.Pelz, the German scientists K. Fritch and H.Zaner, the English scientist L.Tonard and others.

The second period of the geological research in Bulgaria encompassed the years after the Liberation till the Balkan wars and the First World War. This was a period of rapid development of geophysical prospecting. It was related to the need for securing resources for the quickly developing industry and coincided with the setting up of the main state institutions in the young country. During this time (after 1880) G.Zlatarski published his first work on geology and ore mining in Bulgarian – "Ores in Bulgaria". The geologic map in scale 1:300 000 developed by him was especially valuable. At the end of XIXth and beginning of XXth century a number of Bulgarian scientists were actively involved in geophysical prospecting - L.Dimitrov, G.Bonchev, L.Vankov, St.Bonchev, D.Allahverdjev, Il.Stoyanov, N.Pushkarov and R.Popov. The first Bulgarian geological institution, Department for Mines and Geological Photo" at the Ministry of Finance was created at that time (1890) where the efforts on the exploration of economically viable mineral deposits were concentrated. In 1895, at the High School (nowadays Sofia University "St.Kliment Ohridski") was established a Department of Geology where especially active was G.Bonchev.

The third period of geophysical prospecting in Bulgaria covered the period between the First and Second World War. During this period were established: the Bulgarian Geological Society (1925); "Magazine of the Bulgarian Geological Society" (1927, still being published today); magazine "Geology on the Balkans" (1934-1946). St.Bonchev as a Head of the Department of Geology at Sofia University since 1923 created the Bulgarian Geological School. His students were a number of well-known geologists, mineralogists and petrologists, geochemists, physico-geographers and mining engineers such as P.Gochev, V.Tsankov, A.Yanishevski, E.KOen, E. Bonchev, B. Kamenov, R. Beregov, L. Antonov, N. Boyadjiev, P. Mande, Hr.

Antonov, Bl. Kamenov, A. Demirev, E.Belmustakov, M.Yordanov, A.Atanasov, etc. In the Mineralogy and Petrography Department at Sofia University worked also Str. Dimitrov, V. Arnaudov, Ts. Dimitrov, P. Bakalov, N. Nikolov, V. Radev, the physico-geographers J.Radev and D.Yranov, the mining engineers G.Konyarov, D.Marinov, B.Radoslavov, G.Vasilev. This period was characterized with active academic and creative work mainly conducted at Sofia University.

German, French, English, American and other companies showed interest towards the mineral deposits in our country in the years before and during the Second World War. In 1936 German entrepreneurs financed preliminary prospecting of Buhovo uranium deposit (in the region of mount Goten). By 1938 12 exploratory pits, 5 ditches, 2 exploratory shafts, one adit and two small outcrops were made. About 100 t. ore, preliminary dressed with about 20 kg of uranium, was exported to Germany. In 1936 the French Orient Company for the mining/extraction of copper was established and later was renamed Luda Yana. In 1937 the English-American Mining Society JSC in the town of Trun for the extraction of gold was established. In the period 1939-1944 the Bulgarian-German JSC Ertz mined chromate ore from "Golyamo Kamenyane" deposit and in 1942-1944 the chromate ore from "Dobromirts" deposit. The first drilling geophysical works in Bulgaria were carried out in 1941-1942 by the French company Shlumeberge.

The fourth period of geophysical prospecting in Bulgaria encompassed the period immediately after the Second World War and continued till the closure of the Geology Committee in 1995. This period was characterized by the created favourable conditions for the development of geophysical prospecting. The reason behind this was the strife of the socialist community to develop the heavy industry and to have complete economic independence from the Western countries. In March 1946 a Law about the setting up of a Soviet-Bulgarian mining company was adopted. The Directorate for Geological and Mining Exploration at the Ministry of Mines (1948) quickly developed. Geological directorates at the companies "Energohydroproekt", "Vodokanalproekt", "Transproekt", etc. were created. The Geological Institute at the Bulgarian Academy of Science (1947) and the High Institute of Mining were created (1953). In 1950 was established the Soviet-Bulgarian Mining Company "GORUBSO" with equal shares of the two countries. It inherited the two companies "Pirin" and "Rodopski metal". In 1952 the Geophysical prospecting enterprise "Redki metali"/Rare Metals was established, followed in 1960 by the Geophysical Institute at the Bulgarian Academy of Science (BAS) and the National Research and Design Institute in the field of mining and dressing of ferrous and non-ferrous metal ores and industrial minerals KNIPPI "NIPRORUDA", the Enterprise for Geophysical Prospecting and Geological Mapping, the State Economic Group "Geophysical prospecting", etc. In 1978 was created the Research and Development Institute on Mineral Deposits.

This period was marked by the main findings of mineral deposits in the country and the start of their development. Geophysical prospecting increased the depth of scientific knowledge and the scope of research in the Earth sciences.

The fifth period in the development of geophysical prospecting in Bulgaria started with the closure of the Committee on Geology at the Council of Ministers (1995) which was reduced to a department in the Exploration of the Earth Directorate at the Ministry of Environment and Waters. This period includes the present days as well and is marked by the decline not only of the geophysical prospecting in Bulgaria but also of all institutions in the country.

Geophysical prospecting is still carried out however not on the previous scale. The Ministry of Environment and Waters provides limited funds for regional geological exploration such as the geological mapping of Bulgaria in scale 1:50 000, prospecting of terrains for dumping grounds, etc. A number of state geological exploration enterprises have been sold to Bulgarian and foreign private entrepreneurs. New geophysical prospecting companies have been established. Concessions for the exploration of oil and gas in North-east Bulgaria and the Black Sea shelf have been given.

FACULTY OF GEOEXPLORATION – ESTABLISHMENT AND DEVELOPMENT

Establishment of the Faculty of Geoexploration

The University of Mining and Geology “St.Ivan Rilski” is *the only Higher School in the Republic of Bulgaria* which offers high quality education in the exploration, mining and processing of mineral and energy resources. Over its half-century of existence more than 17 000 specialists – Bulgarians and citizens from more than 40 countries from Europe, Asia, Africa and South America – have been trained.

The Faculty of Geology is one of the main faculties of the University having given the foundation of geophysical prospecting in Bulgaria from the beginning of 1950s till nowadays. Over this period more than 9000 specialists have been trained in: exploration and prospecting of mineral deposits, engineering and geological, geophysical and drilling prospecting for the construction of buildings, roads, tunnels, oil and gas pipelines, hydro-geophysical prospecting, geophysical prospecting for the definition of seismic and tectonic regions in Bulgaria, Earth and planet studies with contemporary geophysical methods, etc.

The history of the University of Mining and Geology and the Faculty of Geoexploration is part of the development of the higher technical education in Bulgaria. Its roots can be found in the period preceding its establishment as a separate educational institution. In the summer of 1941 after a proposal of the Bulgarian Engineering and Architectural Society the Bulgarian Parliament voted the Law on Higher Technical School (State Gazette N 126 of 12.06.1941). The official opening of the school was on 4th October 1942 at the ceremonial hall of Sofia University “St.Kliment Ohridski”.

The first technical and technological university centre, established on 4th October 1942, followed the model of the leading educational centres in Western and Central Europe specialized in this sphere. The academic staff were trained in renowned higher technical schools in Germany, Austria, France, the Czech Republic and other Western European countries. One of the criteria of the Committees, which were selecting the academic staff for the Bulgarian Higher Technical School, was each of its members to have passed a one-year specialization in similar European higher schools before starting to teach. Notwithstanding the hard war years the management of the Higher Technical School followed strictly the decisions taken at its establishment.

In the autumn of 1945 the Higher Technical School was transformed in the State Polytechnics “Stalin” (Decree for amending and supplementing the Law on Higher Technical School with the amendments and supplements from 5th April 1945, made public by Decree N237 of 17.10.1945 of the Regents of the Kingdom of Bulgaria – State Gazette 248 of 24.10.1945). It had four departments one of which was of “Mining and Geology”. However, because of the lack of well prepared academic staff in that sphere, the department started to function several years later. In 1950 the Mining and Geology Department was again established with a decree of the Presidium of the National Assembly N246 of 31.05.1950 (State Gazette N129/02.06.1950). At the same time, the Mining Engineering and Engineering Geology Department was incorporated in the Machine Faculty of the Polytechnics. It had two sub-departments – Engineering Geology and Mining Engineering and its first chairman was Prof. Stefan Boshev.

In the beginning of 1950s the State Polytechnics started to widen its scope of specialties. This process was accompanied by the increase of the number of subjects taught there. The dynamic development of the State Polytechnics and the increased needs about engineers brought about the transformation of the higher technical education. In 1951 an attempt was made to solve this problem via internal re-structuring of the State Polytechnics – Decree N484 of the National Assembly of 22.09.1951 (State Gazette N77 of 25.07.1951). A separate Chemical and Technological Faculty was established in which the Mining Engineering and Engineering Geology Department was incorporated. Prof. Stefan Boshev was elected Dean of the new faculty. He later became the Head of the Faculty of Geology at the Institute of Mining and Geology.

The process of differentiation and specialization of engineering education quickly developed at that time. The possibility for education in only one higher school was not sufficient any more. So, in 1953, with a Decree

published in the IZVESTIA of the Presidium of the National Assembly, N 47/12.06.1953, the State Polytechnics "Stalin" was divided into four independent higher schools one of which became the Institute of Mining and Geology.

The first major period in the development of the Faculty of Geoexploration started on 12.06.1953 – the date of establishment of the new Higher School, the Institute of Mining and Geology. This period continued up to the end of 1950s. The newly established Institute of Mining and Geology had two faculties – Geology and Mining with a total of nine degree programmes. The Faculty of Geology offered training in the following degree programmes:

- Geology and Exploration of Mineral Deposits with four different courses: "Geology and exploration of ore deposits", "Geology and Exploration of Industrial Minerals", "Geology and Oil Exploration", "Geology and coal;
- Engineering Geology and Hydrogeology
- Geophysical Methods of Exploration
- Exploration Technique.

These four degree programmes had continued to exist for several decades and to characterize the Faculty of Geology. Today some of them have been re-named and changed according to contemporary needs.

The education in the Faculty is provided by two types of Departments – profiling and general subjects.

The profiling departments underwent different stages of development. The following profiling departments from the State Polytechnics moved to the newly established higher school: "Geology and Exploration of Mineral Deposits", "Mineralogy and Petrography", "Geology and Paleontology", "Engineering Geology and Hydrogeology", "Geophysical Methods of Exploration". The Exploration Technique Department was established in 1973 after dividing the Electrification of Mines Department into three separate ones: "Electrification and Automation of Mining Works", "Exploration Technique" and "Technical Mechanics".

From the general subjects departments of the State Polytechnics only the Department of Physics remained.

Initially, the academic staff of the departments was secured through the appointment of about 40 lecturers from the State Polytechnics and later through attracting a number of new academicians from other higher schools and mainly from Sofia University "St.Kliment Ohridski". Notwithstanding the fact that by the end of 1953 there were 73 full-time lecturers at the Institute (6 Professors, 12 Assoc. Professors, 55 Instructors), the Institute still suffered from insufficient number of well prepared lecturers. That's why lecturers from abroad were invited – the Exploration Technique Department was headed by Assoc.Prof. P.N.Torski, the Geophysical Methods Department - by Assoc.Prof. V.P.Nomokonov (commissioned from USSR), etc.

The Institute of Mining and Geology was situated in the buildings of the State Polytechnics till 1961. In 1962 the Institute moved to a complex of four training buildings, an administrative building and several laboratory premises.

Since 1954 the University has been publishing its own issue named "Yearbook of the Institute of Mining and Geology", later "Yearbook of the University of Mining and Geology". The Faculty of Geology has its own volume "Yearbook of UMG "St.Ivan Rilski" on Geology and Geophysics".

Development of the Faculty of Geoexploration

The second period of the Institute of Mining and Geology started in the beginning of 1960s and ended in the beginning of 1990s

The Scientific and Research Sector was established at the Institute of Mining and Geology in 1961 which brought about significant changes in the work of the Institute. It allowed for the academic staff to actively participate in the practical work of enterprises from the mining industry. A number of consultancy and research contracts have been implemented between academic members of the Faculty of Geology and different enterprises. Members of the academic staff were actively involved in the establishment and development of

the major enterprises in the energy and mining industry – Maritsa Iztok, Bobov dol, Gorubso, Redki Metali, Asarel Medet, etc. The academic staff have numerous innovations.

These activities have contributed to increasing the income of the Higher School, enlarging and enriching its material resources, developing the theoretical and practical training and to creating opportunities for closer cooperation between theory and practice. Thus, the image of the Institute among the related branches of industry has also been improved.

In 1965 the Institute was renamed into “Higher Institute of Mining and Geology”. The relation of the scientific and research work of the academic staff with the production needs led to important changes in the educational process. During this period were established a number of new units to provide for the educational process, the theoretical, research and development activities. In 1966 the Central Research Laboratory of Geochemistry was created. It united already existing and new laboratories and supported the solution of scientific and practical problems related to the exploration of mineral resources. Today the laboratory is accredited nationally and works with different companies, institutes, production and scientific units from Bulgaria and abroad. Other laboratories have been created as well: Polishing Laboratory, Laboratory of Sedimentology, Laboratory of Electronic Microscopy, the Radiography and Radiometry laboratory (nationally accredited and one of the few left in Bulgaria), the Laboratory of Phase Methods and Radiography Structural Analysis, the Training and Production Centre, In 1976 was established the Laboratory of Technique and Technology of Drilling, later on was established the Research Laboratory of Energy Geo-resources, etc.

The Faculty is proud with its two Museums: of Mineralogy, Petrography and Minerals and of Geology and Paleontology. The first steps for the establishment of the Museum of Mineralogy, Petrography and Minerals were made before the separation of the Institute of Mining and Geology from the State Polytechnics. It was at that time when the collection and classification of minerals, rocks, ores and industrial minerals samples started. Later on, they were distributed in different systematized collections. The museum started to fully function at the beginning of 1960s when it was situated in separate premises in the Faculty of Geology and later on moved to a building specially built for that purpose. The Museum of Geology and Paleontology was created in 1965 on the basis of an educational collection at the Geology and Paleontology Department and donations from academic staff and individuals. Different types of rocks, fossils and other materials from Bulgaria and abroad have been collected, stored and exhibited for training purposes.

Parallel to the creation of new structures within the Higher Institute of Mining and Geology (HIMG), respectively the Faculty of Geology, the cooperation with related educational institutions was developed. In the beginning of 1960s institutional relations were established with foreign higher schools. The first agreement for cooperation and support was signed with the Moscow Institute of Mining in 1963. In the following years similar agreements were signed with the Moscow Institute of Geophysical Prospecting, Krakow Academy of Mining and Metallurgy, Freiberg Academy of Mining, the Higher Technical School in Košice and many other higher schools mainly from Eastern Europe. The professional contacts of the academic staff of the HIMG and in particular of the Faculty of Geology started to develop and deepen. The types of cooperation started to differentiate. The Bulgarian scientists began to prepare their theses abroad.

In the beginning of 1980s the Faculty of Geoexploratrion expanded – there were now 7 departments, five of them profiling and 2 two of general subjects. About 1000 students from the first to the fifth year of study were annually trained.

Following a government decision for the introduction of new nomenclature for professional fields and subjects in the higher education in Bulgaria, in 1983 by a Decree N8/22.03.1983 of the Council of Ministers the HIMG was restructured and one more Faculty was formed – the Faculty of Mining Electromechanics. The two mining faculties started to function independently as of 1986/87 academic year.

In November 1989 major political and socio-economical changes started in the Bulgarian society. The successful and fruitful period of development of the geophysical prospecting in Bulgaria unfortunately ended in 1995 with the closing of the Committee on Geology at the Council of Ministers. The management and the

academic staff of the HIMG made considerable efforts to adapt to the new conditions and to stabilize the institution.

The beginning of the 1990s marked the start of the present period in the development of the Faculty of Geoexploration. On the basis of the Higher Institute of Mining and Geology with a Decree N117/10.08.1995 of the Council of Ministers ***the University of Mining and Geology “St.Ivan Rilski”*** was created. The three faculties were preserved. In 2000 was established the Department of Humanities which provides the training in philosophical and social sciences, foreign languages and sport.

The changes in the Law on Higher Education in Bulgaria led to restructuring in the education provided by the higher schools. In accordance with the educational model in Europe and the USA, three educational degrees were introduced – two educational and qualification degrees Bachelor and Master and a third educational and scientific degree Doctor. The restructuring of the Faculty started in 1998 and continued in the following 4-5 years. The first alumni of Bachelors and Masters graduated in this period. In 2002 two new specialties were introduced in the Faculty of Geology. The specialty Geology and Geoinformatics was created at the Geology and Paleontology Department and the specialty Biotechnologies – at the Engineering Geoecology Department. According to the new National Registry of Professional Fields of the Ministry of Education and Science, most of the specialties at the Faculty of Geology fall within Professional Field. “Research, Mining and Processing of ores and minerals”. The specialty “Hydrogeology and Engineering Geology” falls within “Architecture and Building Constructions” and the specialty “Ecology and Environment Protection” – within “Ecology”. The next important step was the accreditation of specialties. The first specialty accredited in the Faculty was Applied Geophysics in professional field. “Research, Mining and Processing of ores and minerals” for the Bachelor, Master and Doctor degrees for a maximum period of 5 years (2002-2007). The other specialties were also accredited. In 2005 after a new change in the National Registry of Professional Fields, three specialties – Applied Geophysics, Ecology and Environment Protection and Geology and Geoinformatics – started to be accredited in the Professional Field 4.4 “Earth Sciences”, the specialties Engineering Geology and Hydrogeology were again accredited within professional field 5.7. “Architecture, Building Constructions and Geodesy”, the Biotechnology specialty – within Professional Field 5.11. “Biotechnologies” and the specialties Geology and Research of Mineral and Energy Resources and Drilling and Oil and Gas Production – within Professional Field 5.8. “Research, Mining and Processing of ores and minerals”. Today all specialties in the Faculty are accredited to the maximum possible period of 5 years.

FOUNDER

DEAN

Prof. Stephan Boshev
(1953-1954)
Prof. Grozdan Nikolaev
(1954-1959)

Prof. Boris Strachimirov (1959-1962)
(1972-1977)
Prof. Simeon Stoinov
(1962-1964) (1976-1979)

Prof Hristo Arnaudov
(1964-1966)
Prof Rashko Rashuov
(1966-1970)
Assos. Prof. Dancho Kanev
(1970-1972)
Assos. Prof. Mihail Moev
(1979-1982)

Prof. Vasil Balinov
(1983-1985) (1990-1991)

Prof. Bogdan Bogdanov
(1985-1987)
Assos. Prof. Radi Radkov
(1987-1989)
Prof. Petko Popov
(1991-1992)
Prof. Todor Marinov
(1992-1995)

Assos. Prof. Svetlozar Bacardjev
(1995-2003)

Prof. Radi Radichev
(2004)

VICE-DEAN

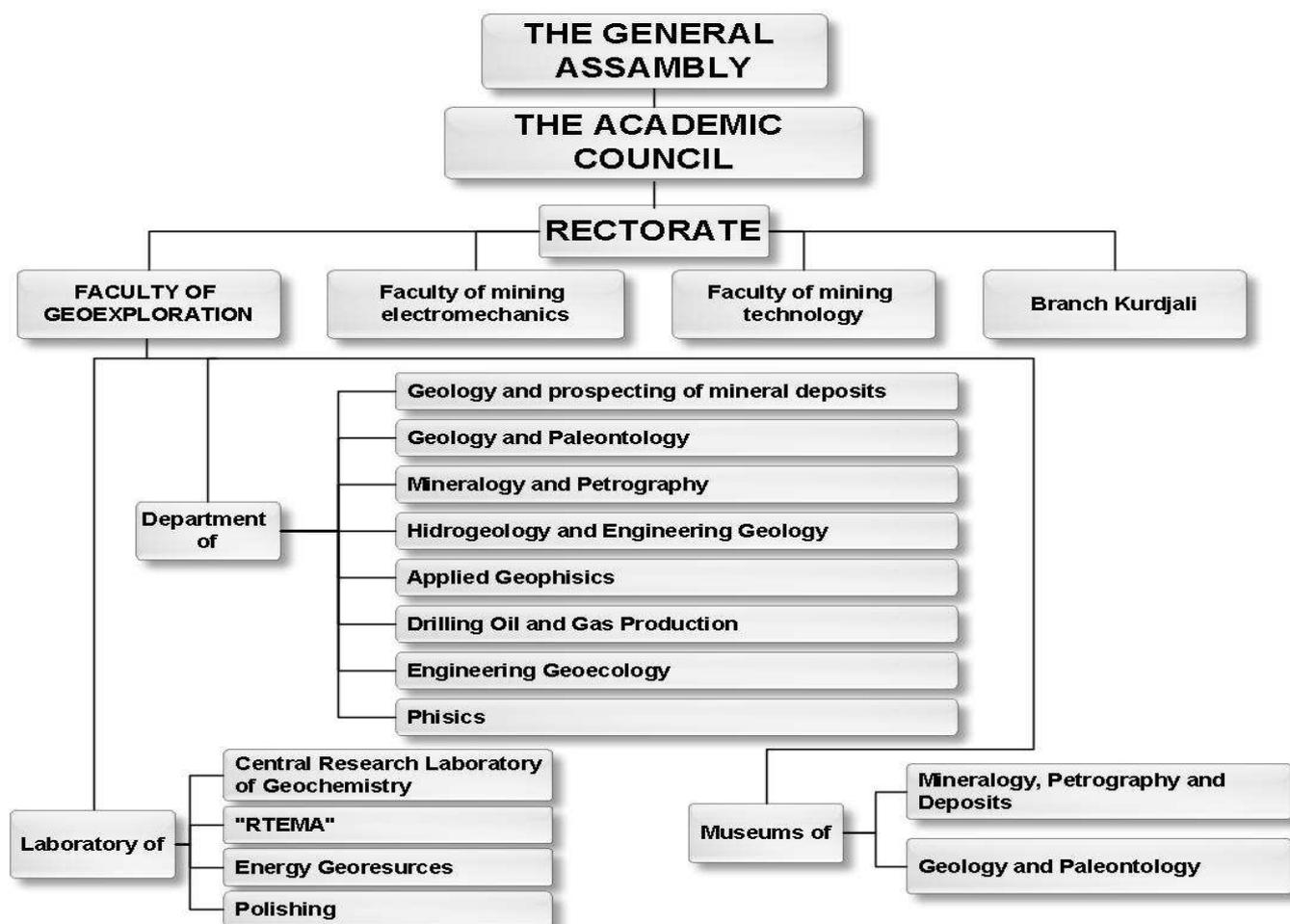
Prof. Grozdan Nikolaev
(1953-1954)
Prof. Simeon Stoinov
(1954-1958)
Prof. Boris Strachimirov (1958-1959)
Prof. Stephan Ognianov
(1960-1962)
Prof. Toma Dobrev
(1962-1964)
Prof. Atanas Demirev
(1963-1964)
Prof. Valko Troshanov
(1964-1966)
Prof. Mikolai Nenkov
(1968-1970)
Assos. Prof. Slavcho Fildishev
(1970-1972)
Prof. Vasil Balinov
(1976-1980)
Assos. Prof. Ivo Lozenski
(1977-1983)
Assos. Prof. Ludmila Ilijeva-Straka
(1983-1985)
Assos. Prof. Emil Deshev
(1990-1991)
Assos. Prof. Radi Radkov
(1985-1987)

Prof. Petar Stavrev
(1989-1991)

Assos. Prof. Krastio Krastev
(1991-1993)
Assos. Prof. Dimitar Siniovski
(1995-1999)
Assos. Prof. Varban Arizanov
(1992-2000)
Assos. Prof. Nikolai Djerahov
(2000-2003)
Assos. Prof. Efrossima Zaneva-Dobranova
(2004)

FACULTY OF GEOEXPLORATION – TODAY

STRUCTURE OF FACULTY OF GEOEXPLORATION



Description of the structure and degree courses.

Six profiling departments and two general subject departments educate the students at the Faculty of Geology in the following specialties:

The Geology and Exploration of Minerals Department (GEMD) trains students in the Bachelor Degree course of Geology and Exploration of Mineral and Energy Resources (GEMER). The students can choose from three Master Degree courses – Economic Geology, Petroleum Geology and Applied Mineralogy.

The Geology and Paleontology Department (GPD) trains students in the Bachelor Degree course Geology and Geoinformatics and the Master Degree course Geoinformatics.

The Hydrology and Engineering Geology Department (HEGD) trains students in the Bachelor Degree course Hydrology and Engineering Geology. The students can choose from two Master Degree courses – Hydrology and Engineering Geology.

The Applied Geophysics Department (AGD) trains students in the Bachelor Degree course Applied Geophysics. The students can choose from five Master Degree courses – Applied Geophysics, Prospecting Geophysics, Petroleum Geophysics, Geophysical Study of the Earth and the Planets, and Natural Hazards/Risks.

The Drilling and Oil and Gas Production Department (DOGPD) trains students in the Bachelor Degree Course Drilling and Oil and Gas Production. There are four Master Degree courses - Drilling and Oil and Gas Production, Mining, Transportation and Storage of Oil and Gas, Exploration Drilling, and Gas Supply.

The Engineering Geoecology Department (EGD) has two Bachelor Degree courses - Ecology and Environment Protection and Biotechnology. There are two Master Degree courses - Ecology and Environment Protection and Biotechnology.

The Mineralogy and Petrography Department (MPD) – trains students in a Master Degree course Applied Mineralogy.

The Department of Physics (DP) provides general education to all students at the UMG “St. Ivan Rilski”

Administrative Services

The functions and activity of the Faculty are defined in the Law on Higher Education and the Regulations of the University of Mining and Geology. The governing bodies of the Faculty are the General Assembly, the Faculty Council and the Dean.

For mandate 2007-2011 the General Assembly has elected a Faculty Council consisting of 30 members, 24 of which are associate professors, two assistant professors and four students.

Chairman of the Faculty Council is Prof. Ph.D Radi Radichev.

The quota of the habilitated members of the academic staff is represented by:

1. Assoc.Prof. Ph.D Strashimir Strashimirov – Geology and Exploration of Mineral Deposits
2. Assoc.Prof. Ph.D Svetlozar Bakardjiev – Geology and Exploration of Mineral Deposits
3. Assoc.Prof. Ph.D Yordan Kortenski – Geology and Exploration of Mineral Deposits
4. Assoc.Prof. Ph.D Mariana Doncheva – Geology and Exploration of Mineral Deposits
5. Assoc.Prof. Ph.D Efrossima Zaneva-Dobranova – Geology and Exploration of Mineral Deposits
6. Assoc.Prof. Ph.D Yordan Yordanov – Geology and Exploration of Mineral Deposits
7. Assoc.Prof. Ph.D Kamen Popov – Geology and Exploration of Mineral Deposits
8. Assoc.Prof. Ph.D Petar Petrov – Geology and Exploration of Mineral Deposits
9. Assoc.Prof. Ph.D. Kiril Angelov – Hydrogeology and Engineering Geology
10. Assoc.Prof. Ph.D Pavel Penchev – Hydrogeology and Engineering Geology
11. Assoc.Prof. Ph.D Nickolay Stoyanov – Hydrogeology and Engineering Geology
12. Assoc.Prof. Ph.D Stefcho Stoinev – Hydrogeology and Engineering Geology
13. Assoc.Prof. Ph.D Ljuben Gugov – Applied Geophysics
14. Assoc.Prof. Ph.D Stefan Dimovski – Applied Geophysics
15. Assoc.Prof. Ph.D Alexander Tsvetkov – Applied Geophysics
16. Assoc.Prof. Ph.D Ljubomir Gerov – Drilling and Oil and Gas Production
17. Assoc.Prof. Ph.D Georgi Nikolov – Drilling and Oil and Gas Production
18. Assoc.Prof. Ph.D Shteryo Lyomov – Drilling and Oil and Gas Production
19. Assoc.Prof. Ph.D Tsvetan Mitrov – Engineering Geoecology
20. Assoc.Prof. Ph.D Banush Banushev – Mineralogy and Petrography
21. Assoc.Prof. Ph.D Vili Lilkov – Physics
22. Assoc.Prof. Ph.D Nickolay Djerahov – Physics

The quota of the non-habilitated members of the academic staff is represented by:

23. Assoc.Prof. Ph.D Stefka Pristavova - Mineralogy and Petrography
24. Assistant Professor Rumens Kulev - Drilling and Oil and Gas Production
25. Assistant Professor Svetlana Bratkov - Engineering Geoecology

The quota of the students and Ph.D students is represented by:

26. Dobromir Netsov
27. Nickolay Dinchev
28. Stoyan Nikolov

29. Gerasim Gerasimov

The Faculty of Geology is managed by a Dean's Office consisting of the Dean, Vice Dean, Head of the Educational Activity and Chief expert. The present Dean of the Faculty is Prof. Ph.D Radi Radichev, Vice Dean is Assoc.Prof. Ph.D Efrossima Zaneva-Dobranova, Head of the Educational Activity – Eng. Diana Panteleeva and chief Expert – Eng. Ralitsa Boncheva.

The Dean's Office administrates the training process through:

- Main books;
- Group and individual exam protocols;
- Protocols for theses defences;
- Internal and external academic records;
- Annual timetable for the educational process;
- Weekly schedules of the lectures and seminars.

The originals of the documentation are stored in the Dean's Office with copies of them – at the Education and Information Department of the University.

The educational documentation at the Faculty of Geology is periodically analysed and updated. It is compared with similar documentation in higher schools abroad. For the purpose of updating the educational documentation for the different specialties and the exchange with similar higher schools, members of the academic staff developed a project which was funded under Contract 4/111 between Competitive System for Training and Management of the Higher Education Centre and the University of Mining and Geology on "Improvement of the engineering education in Earth Sciences at the University of Mining and Geology "St.Ivan Rilski". Project manager is Assoc.Prof.Dr. Str.Strashimirov from the Geology and Exploration of Mineral Deposits Department. The project is funded by the World Bank within a programme of the Ministry of Education and Science for the development of higher education in Bulgaria.

According to the requirements of the Law on Higher Education the academic staff of the Faculty are assessed by an Assessment Committee chaired at present by Assoc.Prof. Yordan Yordanov.

Organisation of the educational process

The educational process in the Faculty of Geology follows the classic academic forms which include lectures, seminars, laboratory and individual education. In the summer students have to attend fieldwork courses as part of the educational process.

For some of the specialties the education is by taking regular courses and by correspondence.

The academic year has two semesters – winter and summer respectively of 13 and 14 weeks duration. The lectures and seminars are not more than 24 hours per week allocated in such a way as to allow studying and preparation on one's own. During the semesters the mastering of theoretical and practical knowledge by the students is constantly checked. Each semester ends with examinations. Make-up and liquidation exams are also foreseen. The forms of assessment are examination and current mark. The students' knowledge is assessed according to the six-mark assessing system as provided by the Law on Higher Education (LHE) and ECTS credit system. The Regulations of the Educational Activity at the UMG "St.Ivan Rilski" set out all the activities in the lecture hall and on the field to cover the credits necessary for the respective subject. Credits can be granted also for participation in practical training and course work or thesis when these are part of the educational process. The maximum credits are 60 per year. The students have the possibility to choose between mandatory and elective courses according to their professional interests and wishes within the educational plan. Students who have special interest in some areas of geology may attend optional courses.

According to art.45 of the LHE, the training for the educational and qualification degree Bachelor ends with a state exam and for Master – with defending a thesis in front of a state exam committee.

Educational degrees

The education provided by the Faculty of Geology (following a decision of the Accreditation Council at the National Evaluation and Accreditation Agency of 11.05.2006) is done in two educational and qualification degrees – Bachelor and Master and one educational and scientific degree Doctor.

Bachelor is the first educational and qualification degree which is acquired after a 4-year course of studies. After successfully holding a set of examinations the students are granted a Bachelor degree for the respective specialty.

Master is the second educational and qualification degree which is acquired after 1,5 to 2,5 years of study (after the acquisition of a Bachelor degree) and ends with defending a thesis. The students after successfully completing the training plan are granted a Master degree.

Doctor is the third educational and first scientific degree for training of PhD students. The education is performed under an individual plan and a degree of doctor is granted which corresponds to the EU and USA degree PhD.

Students and Academic staff mobility and professional contacts

The students and academic staff mobility and professional contacts at the Faculty of Geoexploration are implemented in the following ways:

Participation in international students associations

The students at the Faculty of Geology actively participate in the work of the Association of Geophysics in Bulgaria and the students' section of the American Society of Exploration Geophysicists (SEG)

The Students section at the Applied Geophysics Department is a collective member of SEG. It was established in 1997 by Prof. Petar Stavrev and the president of SEG at that time, Ruth Bridges. The aim of the section is to acquaint the students with the variety of innovations in the sphere of applied and prospecting geophysics, the problems in obtaining and processing the data and methods and ways for their overcoming. Various events are organized where they can present papers on different issues. Each year the section receives application forms from SEG for enrolment of new members and confirmation of the present members. The expenses are covered by SEG, Hallyburton and other companies and organizations. The members of the section constantly receive news via e-mail and the magazines *The Leading Edge* и *Geophysics*. The membership in the students' section gives the possibility for the students to participate in educational programmes in American colleges for Bachelor, Master and PhD degree courses, different specializations and to apply for partial or full scholarships at the respective organization. Further information can be obtained at <http://www.mgu.bg/drugi/pages/umggs>.

The students of the Faculty of Geology actively participate also in the events organized by the American Association of Petroleum Geologists.

The Chapter is University of Mining and Geology "St. Ivan Riski" Student Chapter of the AAPG was established at January 2000 by George Ajdanlijsky and 11 students from the Economic Geology and Hydro-geology specializations. Till now the Chapter members have been 181 students from the Faculty of Geology. Today the list of the Chapters member consists of 14 students from almost the all specializations in the Faculty of Geology: Economic Geology, Hydro-geology and Engineering Geology and Drilling and Oil and Gas Production. The Chapter has Officer's Board and three Committees.

The main purpose of the Chapter is to popularize the new ideas and technologies of the production and exploration of mineral and energy resources, their storage, as well as the management of the environmental impact of these activities. Among the purposes of the Chapter is to provide the contacts necessary pursue those opportunities. The group is working toward getting in circulation the few principal and specific views of regional geology of Bulgaria.

Part of the Chapter work is creation of the leader and organizational manners and experience in the students for planning, organization and realization of the projects in team. The Chapter's achievements in this direction

were estimated highly with Distinguish Student Chapter of AAPG Award for 2002. In addition Grant-in-aid AAPG Foundation has granted 7 Chapter members for realization of own research projects.

The main activities of the Chapter are in following fields: organization of short term field seminars; visiting of attractive or key geological objects and areas; organization of lab seminars with presentation or demonstration of modern lab methods for collection, examination, processing and presentation of geological data; development of individual or team student scientific projects; development of joint projects and activities with other student formations (Bulgarian or from the region); organization and realization of lectures, seminars and short courses; participation in regional and international training seminars and courses, scientific seminars and conferences; completion and development the library funds of the Chapter with specialized periodic issues, maps, monographs etc.; active partnership in the international AAPG programs.

Among the significant achievements of the Chapter is its active partnership in AAPG Distinguish Lecturer Program and Visiting Geologists Programs, organizing presentations of worldwide famous specialists as Henry Posamnetier, Carlo Dogliony, John Welsh etc.

The library fund of the chapter contain over 500 issues.

International educational programmes

The contacts of the academic staff of the Faculty of Geoexploration with foreign partners have been part of the international activity of the University since its establishment.

Till 1989 the Faculty of Geology kept traditional relations with colleagues from Eastern European countries, mainly with higher schools from the USSR. It was mainly due to academic staff that had graduated or had defended their thesis in similar higher schools in Moscow and Leningrad. Within bilateral agreements research was carried out with colleagues from Moscow Institute of Geology and Research, Lomonosov State University, universities from Kiev, Tbilisi, etc. Among the other Eastern European Universities can be mentioned Freiberg Mining Academy, Lorents Etveos University in Budapest, the Ore and Geology Faculties at Belgrade University and Cyril and Methodius University in Skopje, the Faculty of Geology at the Bucharest University, etc.

Since 1989 the contacts with Central and Western European Universities have been intensified. The possibilities offered by EU programmes such as Tempus, Erasmus, Jean Monnet, SCOPES, etc. have been actively used.

A number of projects were implemented within the Tempus Programme to introduce the educational degrees Bachelor and Master in partnership with universities from Leuben -Austria; Brandenburg Technical University in Cottbus, Germany, the university in Gracevald and in Limoges, France. Many individual specialisations of the academic staff were carried out in universities in the Netherlands, Belgium, England, Scotland, etc.

In the last few years the international contacts of the Faculty have been mainly carried out under the Erasmus programme. Each year about 5-10 Bachelor, Master and Ph.D. students are trained from three to six months in universities in Leuven, Oviedo, Madrid and other renowned European academic centres. At the same time significant efforts have been made to renew the contacts with colleagues from Poland, Hungary, Russia, the Czech Republic and other Eastern European traditional partners of the Faculty. Within this programme many lecturers from the Faculty have been invited to read courses abroad.

Under the European programme GEODE and the Swiss programme SCOPES lecturers from the Faculty together with colleagues from Switzerland, Austria, England, Georgia and other countries developed interesting topics related to geology and deposits in Europe.

Participation in national and international research projects, conferences, seminars, congresses and other fora

Students from the Faculty of Geology actively participate in scientific fora, symposia and seminars. On the basis of the additional theoretical and practical courses, together with their tutors or independently, they prepare and present the results at scientific conferences, participate in the organisation of competitions and contests in Bulgaria and abroad.

In May 2009 at the Congress of the Balkan Geophysical Society supported by the Society of Exploration Geophysicists (SEG) and the European Association of Geoscientists and Engineers (EAGE), the youth section of the Bulgarian delegation (a collective member of SEG) won the SEG Challenge Bowl which is an international contest testing students' breadth and depth of knowledge about the field of geoscience. They were invited by SEG to participate in a similar contest in the USA.

Participation in specialised and general geological practice and expeditions in the country and abroad

Field work is very important for the adequate education of the students. A training centre was created in the village of Ljutibrod for this purpose. The centre is established in a unique geological region in the Iskar gorge. It is a starting point for the geological routes in the region which illustrate the geological phenomena in Regional Geology, Geological mapping, Mineralogy and Petrography, Sedimentology. The students in the different specialties at the Faculty are provided with the possibility to get fully acquainted with the geology in Bulgaria through specially chosen routes in the various structural and tectonic zones.

Practical course in Geology, Hydrogeology, Engineering Geology, Geophysical practices, Drilling, Oil and Gas Production and Transport and Ecology are organised in interesting and appropriate sites in the country and abroad to illustrate specific cases. It has already become a tradition to organise summer practical courses for the students at the Faculty of Geology together with their colleagues from Romania which take place in the towns of Constanța and Bourgas; together with the Moscow State Mining University, etc. Student geological excursions in Bulgaria have also been organised in cooperation with colleagues from the University of Leicester, UK, and the University in Cottbus, Germany. The Faculty have organised geological excursions for foreign participants in a number of scientific fora taking place in Bulgaria and in neighbouring countries.

Participation in University sport teams

Sport is very important in the training process of young engineers. The University provides the students with the opportunity to practice a variety of sports – basketball, volleyball, football, fitness, table tennis, badminton, callanetics, swimming, mountaineering, yoga. The active involvement and skills of our students are evident from their participation in the sport teams of the University at students' state championships and in the Federation leagues – football, futsal, basketball, table tennis, volleyball.

Facilities

There are good conditions and facilities for training, establishing professional and personal contacts and active student life at the Faculty of Geology, UMG "St.Ivan Rilski".

IT and Internet centres

The IT centres are situated in the main building of the Faculty where all students, academic and administrative staff can use them. They are equipped with modern software and hardware. A large part of the seminar courses take place there so that students can get acquainted with the contemporary methods for visualisation of the complex geological processes, the current achievements in the Earth sciences and to establish contacts with colleagues from all over the world.

Centre for Education and Qualification

The Centre organises long- and short-term courses for Bulgarian and foreign students in different subjects related to the geological, mining and economic sphere as well as foreign language training courses.

Library

The academic staff and the students at the Faculty of Geology can use the rich library fund on topics related to Earth sciences, technical sciences, architecture, construction and geodesy, biotechnologies, etc.

The library at the University of Mining and Geology disposes of more than 104 503 volumes of scientific literature and periodicals and it is constantly updated and new titles are being added.

Each Department at the Faculty of Geology disposes of its won specialised library fund.

Centre for Career Development

The Centre for Career Development at the UMG "St. Ivan Rilski" was created with a decision of the Academic Council N8/20.06.2007. Its establishment is part of the National programme for student internships promoted

by the Labour Market Project and supported by USAID. The main aim of the Centre is to provide business with highly qualified specialists and to reduce the unemployment among young people. The Career Centre studies the labour market and informs the academic management about the demand and supply tendencies. Thus, the University can be more flexible in providing specialties and training programmes which correspond to the needs of the business.

Students' Council

The Students' Council was established as an independent body in 1998. It provided the students with the possibility to participate in the management and development of the university and to be actively involved in the academic life of the university. The Council cooperates with all Faculties and Departments in the University and takes part in the organisation of different celebrations and scientific fora. It also participates in the students' exchanges with leading companies in the mining industry within different programmes and projects in the country and abroad. Members of the Students' Council later occupy management positions in government and non-government organisations as they have gained significant experience during their work at the Council. This proves that the structure is one of the best among the Students' Councils in Bulgaria.

Student Hostels

The students at the Faculty of Geology live in contemporary hostels in the Students' Campus where more than 1500 beds are available.

Research Laboratories

There are a number of specialised laboratories with contemporary equipment and facilities at the Faculty of Geology.

Central Research Laboratory of Geochemistry

It was created as a separate integrated laboratory inheriting the specialized laboratories for analysis of mineral resources at the Mining Engineering and Engineering Geology Department at the State Polytechnics in 1966. The laboratory was headed consecutively by Prof. R.Rashkov, Assoc. Prof.V.Atanasov, Prof. V.Balinov, Assoc.Prof.A.Sultanov and Assoc.Prof. M.Vatsev, Dipl. Eng. E.Kamburova. At present the laboratory is headed by Dipl. Eng. G.Stoyanova. The personnel of the laboratory are of University specialists who are very well trained and know the standards and methods used in laboratory testing.

Since 1997 the laboratory has been certified as Accredited Testing Laboratory. The current Accrediting Certificate of the Central Research Laboratory of Geochemistry is N66LI (17)/08.03.2004 and is valid till 19.10.2014 following BDS ENISO 17025:2001 and issued by the Bulgarian Accreditation Agency.

The products and research the laboratory has been accredited for are the following:

- determining the element and mineral composition of ores and products from their processing – concentrates, wastes, slimes, etc.;
- determining the element and oxide composition of industrial natural and synthetic materials – rocks, sediments, sands, clays, glass, cements, ceramic and construction materials, coals, etc.;
- determining the element composition and forms of existence of objects in the environment – soils, sediments, dust;
- determining the element composition of waters – mineral, drinking, surface, underground, waste, industrial, etc.;
- determining the element composition of metals, alloys and electronic scrap.

The main aim of the laboratory is to develop and provide methods for testing following the Bulgarian and international standards, as well as to carry out scientific research and training meeting the needs and quality requirements of internal and external clients. The quality of its work is ensured through the selection of highly qualified specialists and modern technical equipment:

- atomic-emission spectrometer with a source of excitation – inductively bond plasma (ICP-AES), SIM+SEQ type, produced by SPEKTRO Analytical Instruments – Germany;

- atomic absorption spectrometer (AAS) produced by Karl Zeiss Jena – Germany with flame and electro thermal atomizer;
- atomic-emission spectrometer with source of excitation DC electric arc (PGS-2) produced by Karl Zeiss Jena – Germany;
- spectrometer Jenway 6300 produced by Jenway – UK for determinations in the ultraviolet and visible spectrum.

Acknowledging the high quality and professionalism of the work at the Laboratory of Geochemistry, many companies have been using its services for research in the last few years. The laboratory staff have participated in the work of KOOMET for the preparation of internationally certified materials and in the work of the commissions at Chief Directorate “National Metrology Centre” for the approximation of the international regulatory documents of ISO and IUPAS in the sphere of analytical chemistry, metrological quality assurance of the measurements, calibration of the means for measurement of content, etc. The laboratory has been included in international programmes of “rotary” laboratory tests for adaptability together with leading laboratories from UK, Canada, Austria, France, Korea, the Republic of South Africa, etc.

The Polishing Laboratory is the successor of similar laboratory at the State Polytechnics. Till 1972 it was within the Central Scientific and Research Laboratory at the UMG. The laboratory was headed consecutively by Assoc.Prof. M.Vatsev, Eng.A.Tsvetanov, Eng. V.Kozhuharov, Eng.E.Kamburova, M.Sivilov. The main sphere of work of the laboratory is related to the preparation of polished micro-sections from mineral, ore and rock samples for the training and scientific work in the university.

Laboratory of Phase Methods and Radiography Structural Analysis – established in 1953 its head is Eng. Alexander Tsvetanov. The laboratory disposes of equipment for radiography and phase analysis type Radiographic Diffractometer DRON-UM1.

The Research Laboratory of Electronic Microscopy was created in 1965, its head is Ass. Prof. Svetla Malinova. The laboratory is licensed at the Research Laboratory for Ionizing Rays NIL “RTEMA” and works with the Departments at the university which use electronic microscopic analysis. It is equipped with Transmission microscope TEM “Tesla” BS 242 D and scanning electronic microscope CEM “Tesla” BS 340.

The Research Laboratory of Energy Georesources was established in 2000, its head is Prof.Vasil Balinov.

The laboratory is an advanced thematic centre for research, laboratory analyses, engineering, consulting, information supply and training in the field of energy georesources (petroleum, natural gas, fossil fuels, geothermal energy and other sources of hydrocarbons: methane from coal deposits, gas hydrates, dissolved gases, etc.). An Expert Council appointed by the Vice Rector on Scientific and Research Work supports its work.

It organizes, coordinates and integrates the activity of experienced and highly qualified professionals from different organizations.

On the basis of integrated information data of various scale the laboratory carries out analyses, summaries and evaluations in the sphere of regional geology for the preliminary survey, exploration and geological foundations for the development of deposits of fossil fuel and reservoir engineering:

- develops integrated historic-geological models of sedimentary basins under complex thermo-pressure conditions;
- estimates the hydrocarbon potential of prospective onshore and offshore territories;
- assesses the potential resources of fossil fuel in particular areas;
- performs detailed studies on stratigraphic sections of sedimentary formations of different lithological-facial type;

- studies the lithological, physical, physico-chemical and fluid-dynamical properties of reservoir systems of different type;
- zonates the area of reservoir systems based on typical characteristics;
- assesses geological preconditions, conditions and opportunities for underground storage of natural gas and CO₂ in potential storage areas of different types;
- studies the physical and physico-chemical aspects of the processes accompanying the development of hydrocarbon accumulations and the underground storage of natural gas and CO₂;
- develops physico-chemical, hydrodynamic, mathematical, and other specialized models of multiphase seepage in reservoir systems of different type;
- carries out standard and specialized laboratory and other tests for the reservoir and isolating rocks and strata systems;
- prepares information packages and other documents for the purpose of receiving licenses for exploration of deposits of energy georesources;
- implements different forms of training of specialists, provides consultancy, information and other services in the sphere of its competence.

Highly qualified specialists (Professors, Associate Professors, Assistant Professors, Assistants, Ph.D. and M.Sc. students) with various professional interests work at the laboratory: regional geology and geophysics, petroleum geology, coal geology, sedimentology, reservoir geology, hydrogeology, hydrodynamics, geochemistry, seismostratigraphy, basin analysis, drilling geophysics, reservoir engineering, etc. Depending on the thematic scope of the projects the Laboratory invites specialists from BAS, Sofia University and other organizations.

In its work the laboratory cooperates with: Exploration and Production of Oil and Gas CO – Pleven, Laboratory Geological Research JSC- Sofia, and Research Institute “Geology and Geophysics” JSC – Sofia. Thus the provision of integrated services for Bulgarian and foreign companies in the country and abroad is ensured. Since its establishment the laboratory has implemented projects assigned by Exploration and Production of Oil and Gas CO and the American company CBM Energy, Houston.

MAIN UNITS AT THE FACULTY OF GEOLOGY

GEOLOGY AND EXPLORATION OF MINERALS DEPARTMENT

The Geology and Exploration of Minerals Department (GEMD) has a history of more than 60 years. Ore Deposits Department was created at the State Polytechnics in 1948 headed by Assoc. Prof. Andrey Yanishevski. In 1950, with Decree N9806/31.05.1950 of the Presidium of the National Assembly (State Gazette N130/30.06.1950), a Unit of Mining Engineering and Engineering Geology was established at the Machine Faculty of the former State Polytechnics with two sections:

- Construction Hydrogeology;
- Exploration of Minerals.

50 students in four specialties enrolled in the new department, 15 of which started to study Exploration of Mineral Deposits. The first seven departments, among which Minerals and Geology and Exploration, were set up in school year 1950/1951 by order N958/09.03.1951 of the Committee on Sport, Art and Culture. Prof. Georgi Georgiev, head of the Mineralogy and Petrography Department, was elected as the first head of the Minerals Department where he stayed till December 1952. On 16 December 1952 Assoc.Prof. Grozdan Nikolaev Grozdev became head of the Department.

In 1953 an Exploration of Mineral Deposits Department was set up within the Faculty of Geology at the Institute of Mining and Geology headed by Assoc.Prof. Grozdan Nikolaev Grozdev.

Over its 55 years of existence the Department has housed more than 30 lecturers and research fellows – 6 professors, 11 associate professors and one senior research fellow, two of them held a Doctor of Geological Sciences degree and 11 – Doctor.

The Department was headed consecutively by: Prof. Grozdan Nikolaev (till 1976), Prof.Rashko Rashkov (1976-1979), Prof.Bogdan Bogdanov (1979-1989), Prof.Petko Popov (1989-2000), Assoc.Prof.Strashimir Strashimirov (2000-2008). Since 2008 Assoc.Prof.Dr. Svetlozar D.Bakardjiev has been elected head of Department.

Nowadays, the department consists of 15 lecturers – 8 associate professors and 6 assistant professors and one assistant. Nine of them hold a Doctor degree and four are going shortly to defend their Ph.D. thesis.

Assoc.Prof. PhD Svetlozar D. Bakardjiev – exploration of minerals and geostatistics

Assoc.Prof. PhD Strashimir Borisov Strashimirov – ore minerals

Assoc.Prof. PhD Yordan Ivanov Kortenski – coal geology

Assoc.Prof. PhD Yordan Milanov Yordanov – petroleum geology

Assoc.Prof. PhD Petar Ivanov Petrov – non-metallic minerals

Assoc.Prof. PhD Mariana Dimitrova Doncheva – petroleum geology

Assoc.Prof. PhD Efrossima Petrova Zaneva-Dobranova – petroleum geology

Assoc.Prof. PhD Kamen Petkov Popov - exploration of minerals and geostatistics

Assistant Professor PhD Stanislav Stefanov Stoikov - non-metallic minerals

Assistant Professor Margarita Dimitrova Vasileva - ore minerals

Assistant Professor Sergei Petrov Dobrev – geochemistry and ore minerals

Assistant Professor Kalin Ivanov Ruskov – geostatistics and exploration of minerals

Assistant Professor Alexander Kirilov Zdravkov – sedimentology

Assistant Professor Hristo Borislavov Dimitrov – petroleum geology

Assistant Professor Nikolay Hristov - petroleum geology

Being profiling, the department provides training in the three educational degrees – Bachelor, Master and Doctor.

Undergraduate students are trained in the degree course Geology and Exploration of Mineral and Energy Deposits. It is fundamental for the training of students in exploration and mining of mineral and energy

resources which are the basis of many sectors in economy. In Bulgaria the degree course is available only at the University of Mining and Geology.

The training in this degree course is the entry level for the training for the Master degree courses in Economic Geology, Petroleum Geology and Applied Mineralogy (the Mineralogy and Petrography Department provides the training for Applied Mineralogy) as well as for the Doctor degree in Geology and Exploration of Minerals, code 010713.

The enrolment of the first students was in school year 1950/1951 at the State Polytechnics, the name of the specialty at that time being Exploration of Minerals. 15 students for full-time studies were accepted. As of 1955/1956 the form of part-time education in the specialty was introduced. Later on, the degree course was renamed to Geology and Exploration of Minerals. In school year 1997/1998 the degree course began to be called Geology of Mineral Deposits.

Currently, the number of enrolled students per year in the Bachelor degree course is 30 students (full-time studies) and 10 students (part-time); for Master Degree courses in Economic Geology and Petroleum Geology – 10 students (full-time studies) and 5 students (part-time); for Doctor degree – 1-3 people.

For the approximation of the Bulgarian education with the European one a project S_JEP12342-97 under the TEMPUS programme of the EU was implemented in partnership with specialists from the Institute of Geology of the University of Leoben, Austria, the Branderburg Technical University in Cottbus, Germany and Sofia University "St. Kliment Ohridski". Till the end of 2002 the degree course was within professional field 8.10 – Geoengineering. After that it was transferred to 8.10.1 – Geology.

Since 2022 the degree course in Geology of Mineral Resources has been set in professional field Prospecting, Mining and Processing of Minerals, code 5.8.

As of school year 2007/2008 the degree course was renamed to Geology and Exploration of Mineral and Energy Resources.

The graduates in the Bachelor degree obtain professional qualification as engineering and prospecting geologists.

The training for the Doctor degree is held mainly in scientific specialty 01.01.13 Geology and Exploration of Minerals, 01.07.20 – Methods and Techniques of Geological Prospecting and 01.07.06 – Sedimentology.

During its 50 years of existence 64 Ph.D theses and 2 D.Sc. theses have been defended.

The lecturers train students from degree courses taught at the Faculty of Geology (Drilling and Oil and Gas Production, Ecology and Environment Protection, Applied Geophysics, Hydrology and Engineering Geology, Geology and Geoinformatics) as well as from those at the Faculty of Mining Technology (Dressing and Recycling of Raw Materials, Mining of Minerals, Geodesy and Mine Surveying, Business Administration and Underground Construction).

1971 specialists (1578 in full-time studies and 393 part-time studies) have graduated by 2009 in the degree course Geology and Exploration of Mineral and Energy Resources (Geology of Mineral Deposits, Geology and Exploration of Minerals and Exploration of Minerals). 63 of them are foreign students.

The academic staff of the Department work in close collaboration and actively participate in scientific and research work together with colleagues from other departments, institutions and organisations. Naturally, closest are the contacts with colleagues from similar departments at the Faculty of Geology. The department members participate in the governing bodies of national geological associations as the Bulgarian Geological Society, BGS, in the editorial staff of magazines such as *Geologica Balkanica* and other, take active part in conferences and events with international participation.

Our academic staff are widely acknowledged and recognized among the international scientific community. They are members of the New York Academy of Sciences, the Association of Organic Petrology, the European Association of Petroleum Geologists, the American Association of Petroleum Geologists, the national representation of the Carpathian-Balkan Geological Association, etc.

The results from their research have been published and presented at numerous international fora and foreign magazines. They have developed more than 100 scientific and applied research projects, the majority of which

have been implemented in practice. The scientific results were presented in more than 2000 publications in renowned Bulgarian and foreign magazines, only for the last year they were 400. Moreover, these achievements have been widely presented at national and international conferences and symposia in over 800 papers and scientific announcements. 10 monographs have been published. The scientific achievements of the authors were reflected in many textbooks.

Our academic staff sustain wide international contacts by participating in numerous international projects – study of the metallogeny and peculiarities of the mineral deposits in the Carpathian-Balkan region; work on problems related to the connection between geodynamics and ore-forming processes within the European project GEODE; creation of geological and genetical models of a number of types of ore deposits (copper and porphyry, massive copper-sulphides, veined and carn copper, stratiform and veined lead-zinc, etc.), clarification of the geological and ecological aspects in the underground storage of natural gas and CO₂.

We can underline the active relations with researchers from the Moscow University, Moscow Geological Research Institute, Georgia Academy of Sciences, Freiberg Mining Academy, the Mining University at Leuben, University of Belgrade, University of Skopje, University of Bucharest, University of Cluj, Ankara University, University of Tirana, the Hungarian Academy of Sciences, the Polytechnic University in Kosice, the Institute of Geology of Minerals in Moscow, the Institute of Geology in Athens, Leicester University, etc. The results from the research are shown in numerous joint publications and monographs. The most significant and noteworthy project is the international project IGCP-356 with the participation of 10 countries where three of our specialists are editors of the materials from the working meetings held in Bulgaria.

The department played a leading role at the annual meeting of UNESCO on problems related to metallogeny and plate tectonics, where apart from the Bulgarian geologists, 71 scientists from 22 countries (including the USA, Canada and Australia) participated. Over the last years representatives of the department actively participated in the organisation of scientific fora (working meetings, symposia, etc.) carried out within the framework of the research programme GEODE and the Bulgarian-Swiss project SCOPEs. Members of the department participate also with their papers in the regular congresses of the Carpathian-Balkan Geological Association.

The projects developed by the lecturers from the department are aimed at solving scientific and applied tasks in the sphere of mineral deposits. The projects are funded by the respective ministries, the Ministry of Education and Science and all geological prospecting and mining enterprises in Bulgaria, many foreign companies, scientific and educational institutions in the European Union, neighbouring countries and countries from the EC. We have active collaboration with many countries from Europe, North America and Asia. The research work in the department is targeted at modern and rapidly developing spheres of science such as environment and water protection, economic geology in relation of GIS, geoinformatics and petroleum engineering and assessment of metal, energy and non-metal resources.

GEMD disposes of well equipped laboratory base.

Laboratory of Ore Microscopy and Industrial Mineral Deposits

The training Laboratory of Ore Microscopy and Industrial Mineral Deposits is equipped with 11 polarising microscopes for microscopy investigation of polished sections under reflected light – for diagnostics of ore minerals. Eight of the microscopes are of type MIN-8 purchased in 1970s. The rest of the microscopes are type POLAM P-311 and were purchased in 1993. Six stereomicroscopes MBS-1, MBS-9 and Carl Zeiss Jena are also used for some of the seminars – for observation of macroscopic unpolished sections with magnifications of 10x to 100x. The laboratory also disposes of one microhardness gauge type PMT-3.

In the laboratory are available educational collections of samples characterizing the main genetic and structural types of minerals as well as characteristic samples of the main metal deposits in the country.

At the training laboratory of Ore Microscopy and Industrial Mineral Deposits is created also a research and training Laboratory of Physics Methods for Study and Diagnostics of Minerals. It is equipped with 2 polarising microscopes NU-2 (Carl Zeiss Jena) for investigation under passing and reflected light and two microscopes Jenaval (Carl Zeiss Jena) for investigation under passing light. One of the microscopes NU-2 is equipped with

photometer for quantity definition of the reflection of the ore minerals. The other microscope NU-2 is equipped with digital colour video camera Panasonic (model GP KR222E) which is connected via video plate Matrox Millennium II and Matrox Rainbow Runner Studio with a graphic station IBM IntelliStation Z Pro. One of the microscopes Jenaval has a heating table type "Zaharchenko" and the other – a table for freezing and heating Chaixmeca type MTM-85 which are used for study of the fluid inclusions in minerals. The combination of a digital video camera – computer allows the taking of photos of microscopic objects, further editing of the digital photos, showing the photo on a TV monitor and recording of video images which show the dynamics of processes observed under microscopes (e.g. homogenization of gas-liquid inclusions under heating).

The Laboratory of Organic Petrology disposes of 12 working place. The 11 training microscopes Carl Zeiss Jena are biological. They give the possibility for studying the coals under reflected light in aerial environment and oil immersion. The students are trained to define the maceral, mineral and microlithotype content of the coals of different range and to observe coals from different Bulgarian deposits. A macroscopic description of these coals is made defining the lithotype content and other physical features. There is also a training microscope for passing light which can be used by the students to study the thin sections of Bulgarian coals and bitumolits.

In 2009 a modern research microscope Leica was purchased which makes possible the observation of coals, bitumolits and embedding sedimentary rocks under passing and reflected polarised light in aerial environment and oil immersion. The laboratory also disposes of an older model of a research microscope NU-2 for passing and reflected polarised light.

The laboratory has a rich collection of thin sections which includes 6000 polished sections, about 500 thin sections and macroscopic samples of coals and bitumolits. The training process is visualised with microphoto material in reflected light (aerial environment, oil immersion, fluorescent light), collection of representative samples of lithotypes, coals of different range from Bulgarian and foreign deposits. In addition via the camera of the Leica microscope which is connected to 42" LCD TV the students can make microscopic observations in oil immersion and fluorescent light.

Laboratory of Distance Methods and GIS. The training laboratory on Distance Methods and GIS was created and equipped in the period 1999-2001 within a TEMPUS-Phare project. The laboratory disposes of 2 computers with graphic stations, model IBM IntelliStation M Pro, two scanners Plustek OpticPro-A3 format and Umax Astra 1220S – A4 format, colour jet plotter HP DesignJet 450C format A0 and colour jet printer HP DeskJet 1120C format A3 as well as some additional peripheral devices such as CD writer HP CD-Writer 9100, archiving device iomegd ZIP 250, etc. The laboratory is connected with the computer hall at the Faculty of Geology through an internal LAN so that its resources can be used by a larger number of students. The laboratory is equipped with a wide variety of specialized software related to distance methods and GIS – ER Mapper, ENVI, TNT Lite, GRASS, PCI OrthoEngine, MicroDEM, ArcView, MapInfo, MicroMSI, Spring, etc. The main aim of the laboratory is to provide contemporary training and practical work for the students in the area of processing and interpretation of different types of distance satellite and aerial-photo images as well as the development and use of GIS in the geological practice.

The Training and Research Laboratory of Physics of the Oil Fields is designed for practical seminars with students from Geology of Mineral Resources and Drilling and Oil and Gas Production at the Faculty of Geology as well as for research work commissioned by external contractors. It is equipped with the necessary equipment for making standard test of the physical properties of the rocks and seam fluids. Additionally, the laboratory disposes of equipment for special studies such as mercury porosimeter Karlo Erba, a stand for studying the petrophysical indicators and filtration processes in bedded conditions; stands for studying the specific surface of the rocks, structure of the embedded space of rocks by different methods, the molecule nature of the hard surface, the phase permeability of rocks, etc. Some of these studies are carried out only at the Laboratory of Physics of the Oil Fields that is why it is a wanted partner by many companies.

Laboratory of Sedimentology. The laboratory disposes of 2 stereomicroscopes MBS-9, electronic scale and a number of sieves for granulometric analysis. The laboratory carries out granulometric analysis of the

sedimentologic samples and defines their mineral content. Petrographic research of sedimentary rocks from different regions in Bulgaria is made.

GEOLOGY AND PALEONTOLOGY DEPARTMENT

The Geology and Paleontology Department was established in 1944 in the Faculty of Construction at the State Polytechnics. One year later it became a Geology and Petrography Department headed by Assoc.Prof. Vasil Arnaudov. On 9 March 1951 the Department was renamed to Geology and Paleontology.

From 1946 on, the department was headed consecutively by Prof. St.Boshev, Prof.B.Strashimirov, Prof.M.Vergilova, Assoc.Prof. M.Antonov, and since 1999 – by Prof.D.Siniovski.

More than 20 subjects have been taught by the department's academic staff in over 15 degree courses from the three Faculties in the University – Geology, Mining Technology and Mining Electromechanics.

Currently, the academic staff of the Geology and Paleontology Department consists of 12 lecturers – one professor, two associate professors, and seven assistant professors. One of them holds a Doctor of Geological Sciences degree and six – the scientific degree of Doctor.

Prof.D.G.S. Dimitar Slavchev Sinyovski
Assoc.Prof. PhD Venelin Zhelev Zhelev
Assoc.Prof. PhD Krastyo Nikolov Krastev
Ass.Prof. PhD Daniela Vasileva Antonova
Ass.Prof. PhD Georgi Krastev Aidanliiski
Ass.Prof. PhD Boris Vladimirov Valchev
Ass.Prof. PhD Ivan Dimitrov Ivanov
Ass.Prof. Sergei Tsvetanov Sevdanov
Ass.Prof. Stefan Pavlov Nachev
Ass.Prof. Elitsa Stoyanova Ilieva
Ass.Prof. Vesselin Paunov Mladenov
Ass.Prof. Stoyan Victorov Tanatsiev
Chief Expert Katerina Draganova Minova
Secretary Valentina Ruenova Poboshkova

The department takes part in students' education in six degree courses from the Faculty of Geology, 3 – from the Faculty of Mining Technologies and 2 – from the Faculty of Mining Electromechanics. It also trains students from the degree course in Geology and Geoinformatics established in 2004 in the main geological disciplines and geoinformatics. The department also provides the education in the main geological disciplines for the students in the degree course Geology and Exploration of Mineral and Energy Resources.

Two GIS laboratories have been equipped over the last several years, each with 10 computers for GIS training and global satellite navigation systems. The field campus for practice seminars in the village of Lyutibrod has been renovated so that a branch of the Museum of Geology and Paleontology to be established and equipment for GIS laboratory to be provided.

The department trains students for the Master degree course in Geoinformatics.

The main activity of the academic staff in the department is related to the introduction of electronic methods of training in the Bachelor and Master degree courses and teaching contemporary information technologies for collection, processing, storage and promotion of the geological information with extended training of English language. The sustainable development concept is reflected in the training provided by the Department so that highly qualified specialists graduate and can realize their potential in different areas such as geoinformatics, ecology, environment protection and promotion of geological heritage, geotourism.

In the last years the department carries out a lot of research work in the area of stratigraphy, paleontology, regional geology, geotectonics, geomorphology, geoinformatics, etc. The academic staff of the department have published more than 350 papers in Bulgarian and foreign magazines, numerous textbooks, teaching aids

and guides. Seven specializations of lecturers and students took place in prestigious European Universities such as the University of Greifswald – Germany, the University of Limoges – France, the Catholic University in Leuven, Belgium, the Karlovy University – Prague, the Czech Republic, Heriot Watt University – Edinburgh, Scotland, the University of Madrid and the University of Oviedo – Spain. Members of the department presented papers at international fora in Bulgaria, Austria, Greece, Spain, Finland, Russia, South Africa and the USA.

The department participates in the implementation of international projects funded within TEMPUS programme, Phare programme, two projects funded by the Ministry of Education and Science, three projects of Navan – Chelopech and a national project of the Ministry of Environment and Waters for the development of a registry and cadastre of the geological phenomena in Bulgaria. Some of the academic staff took part in the elaboration of five reports for the mapping of the National geofund in scale 1:25 000 and more than 30 maps and explanatory notes for the mapping of Bulgaria in scale 1:50 000.

In 2000 at the department was founded a Students' group of the American Association of Petroleum Geologists (AAPG) which regularly takes part in meetings with famous Bulgarian and foreign specialists in different spheres of geology among which are Henry Posamentier and John Walsh. Field excursions, seminars and exchange of information are carried out with similar groups in other countries. The group was awarded as the most active group of AAPG in the world in 2002. In the same year the department hosted a course of the International Association of Sedimentology implemented in cooperation with the University of Fribourg, Switzerland and Imperial College, London.

Currently, two of the lecturers at the department are members of the AAPG and two – of the European Association for Preservation of the Geological Heritage ProGEO.

MINERALOGY AND PETROGRAPHY DEPARTMENT

The Mineralogy and Petrography Department was created in 1951 and was headed by Prof. Georgi Georgiev (1951-1974). After 1974 the Department was consecutively headed by Prof. Simeon Stoinov (1974-1979), Assoc. Member of the Academy of Science Prof. Ivan Velinov (1979-1981), Assoc. Prof. PhD Alexander Sultanov (1981-1989), Prof. D.G.Sc. Todor Marinov (1990-2000), Assoc. Prof. D.G.Sc. Margarita Tokmakchieva (2001-2008) and since 2008 – Assoc. Prof. PhD Banush Banushev. Currently, the department has three associate professors, three assistant professors, chief expert and technical assistant.

Members of the department are:

- Assoc. Prof. PhD Banush Banushev
- Assoc. Prof. PhD Ruslan Kostov
- Assoc. Prof. PhD Stefka Pristavova
- Ass.Prof. PhD Radostin Pazderov
- Ass.Prof. Svetal Malinova
- Ass.Prof. PhD Nikoleta Tsankova
- Chief expert Eng. Marieta Georgieva
- Technical assistant Penka Banusheva

The lecturers at the department have more than 800 publications, 15 monographs, 25 textbooks and teaching aids in the field of mineralogy, archeo-mineralogy, gemology, igneous and metamorphic petrology. They have specialized in scientific and training centres in Russia, UK, Austria and Belgium. The members of the department have participated in more than 100 scientific fora in the country and abroad and have developed about 90 research projects.

The department trains students in Bachelor Degree courses from the Faculty of Geology and the Faculty of Mining Technology in more than 20 basic geological disciplines like Crystallography and Mineralogy, Petrography, Igneous Petrology, Metamorphic Petrology, etc. Training is also provided on specialized and general disciplines.

The department trains students in the Master Degree course in Applied Mineralogy which prepares highly qualified specialists in the field of mineralogy and petrology. The Master students in Applied Mineralogy acquire theoretical and practical knowledge in exploration, prospecting, mining and processing of jewels and decorative lining rock materials. They can also make diagnostics and evaluation of jewels and precious stones and carry out research and experimental work in different branches connected with the natural and technogenic mineral systems.

The members of the department carry out **specialized courses** for postgraduate qualification in Technique and Technology for Processing of Jewels and Jewel-decorative Minerals, Diagnostics of Jewel Minerals and Ore Changes of Rocks at the Centre for Education and Qualification.

The department provides also practical, on-the-field training on Crystallography and Mineralogy, Mineralogy and Petrography, Petrography, Petrology, Igneous Petrology and Metamorphic Petrology.

Contemporary and well equipped laboratories are created at the Department of Mineralogy and Petrography - Crystallography and Mineralogy, Crystallo-optics and Petrography, Sedimentology and Processing of Jewel-decorative Minerals.

The department disposes of educational collections for the disciplines of Mineralogy, Mineralogy and Petrography, Petrography, Igneous Petrology and Metamorphic Petrology and models for Geometric Crystallography and Crystal Chemistry.

In 2009 within a project funded by the National Science Fund a Centre for Geological and Geophysical Research was created, modern specialized gemological equipment for diagnostics of jewel minerals and new polarization microscopes Meiji were purchased. The equipment ensures the provision of high quality education of Bachelor and Master students in Applied Mineralogy at the Mineralogy and Petrography Department, students in Master degree courses from Sofia University "St.Kliment Ohridski" and New Bulgarian University, Ph.D. students and specialists. The equipment could also be used for scientific research within joint projects with scientists from the Institute of Geology at the BAS, the Central Laboratory of Mineralogy and Crystallography at the BAS, the National Museum of Natural History at the BAS and the National Museum "Earth and Man".

HYDROLOGY AND ENGINEERING GEOLOGY DEPARTMENT

The department and the degree course Hydrology and Engineering Geology (HEG) were established in 1951 by a government decree. By 1953 the department was within the State Polytechnics. After that it was transferred to the newly established Institute of Mining and Geology and its Faculty of Geology. It is one of the five profiling departments in the Faculty which prepare specialists with engineering qualification. Since its establishment till 1974 it was officially named Engineering Geology and Hydrology, after that period it was renamed to Hydrology and Engineering Geology. The famous Bulgarian scientists - Assoc. Member of the Academy of Science Prof. Boyan Kamenov, Prof. Hristo Antonov, Prof. Atanas Demirev and Prof. Mihail Galabov – played a significant role for the establishment and development of the department and specialty HEG.

In the beginning the department was headed by Assoc. Member of the Academy of Science Prof. Boyan Ganchev Kamenov (1951-1972), followed by Prof. Atanas Tyankov Demirev (1972-1984), Prof. D.G.Sc. Mihail Minkov Galabov (1984-1999), Assoc.Prof. PhD Kiril Alexandrov Angelov (1999-2003), Assoc.Prof. PhD Pavel Petrov Penchev (2003-2008). Since 2008 Assoc. Prof. PhD Stefcho Boyanov Stoinev has become Head of the department. The HEG department has 10 employees among which 4 associate professors, 4- assistant professors, an engineer and a technician.

Assoc. Prof. PhD Kiril Alexandrov Angelov

Assoc. Prof. PhD Stefcho Boyanov Stoinev

Assoc. Prof. PhD Pavel Petrov Penchev

Assoc. Prof. PhD Nikolai Tonev Stoyanov

Ass. Prof. Antonio Vutov Lakov
Ass. Prof. Stanislav Dobrev Kovachev
Ass. Prof. Ina Bozhidarova Popova
Ass. Prof. Boryana Yordanova Deneva
Eng. Victoria Georgieva Cherneva – Teneva
Technician Goritsa Vasileva Andonova

Being profiling, the department trains students in the Bachelor degree course Engineering Geology and Hydrology and in two Master degree courses – Engineering Geology and Hydrology. More than 1300 students have graduated in Engineering Geology and Hydrology and they have found their professional realization in a wide range of companies in Bulgaria and abroad. A considerable part of our graduates start working in prospecting and consultancy companies which are focused on hydrogeological and engineering and geological prospecting, geotechnical and mining construction, water supply, etc. More than 45 of our graduates have been employed only in 2009. Another percentage of the young graduates from HEG are hired in the state and municipal administrations as junior and senior experts at the Ministry of Environment and Waters, the Ministry of Regional Development and Public Works, the River Basin Directorates (Pleven, Varna, Plovdiv, Blagoevgrad), the Environment Agency, the Regional Inspectorates of Environment and Waters, municipalities, etc. By 2009 more than 20 people having graduated in the period 2002-2009 have started to work in the above-mentioned ministries, agencies and directorates.

Some of our graduates work in research institutes and universities such as the Institute of Geology at the BAS, the Institute of Water Problems at BAS, National Institute of Meteorology and Hydrology at BAS, the University of Mining and Geology – the scientific and research unit.

About 20 of our graduates work abroad utilizing the acquired knowledge in research institutes and companies in the USA, Canada and Australia.

For a long time the department developed fruitful cooperation and exchange of research and academic staff with similar departments and institutes in Moscow, Leningrad, Kiev, Krakow, Freiberg, Bratislava, Prague, etc. Since 1990s the international contacts have started to be targeted at the EU countries. Its staff play a vital or leading role in the implementation of research and engineering projects and programmes including a project for the hydrogeological, engineering and geological mapping of the territory of the country. Both in the past and in the present the HEG degree course has had a considerable social and economic importance and today this is one of the most wanted degree courses in the University of Mining and Geology. The current developments in the social and business sphere presuppose even better future for this professional field.

Laboratory equipment for the educational process and important research projects

The department disposes of two laboratories – of hydrology and of engineering geology.

The Laboratory of Hydrology has equipment for experimental-filtration and migration study for defining the hydrogeologic and migration parameters of the filtration environment. It has carried out research for defining the migration parameters in solving a number of ecological problems.

The Laboratory of Engineering Geology is equipped with modern tools and equipment for study of the physico-mechanical properties of the construction soils. The laboratory equipment allows the carrying out of studies according to the Bulgarian standard BDS, as well as BS, DIN and ASTM. The laboratory carries out research for the most significant energy and infrastructure projects in Bulgaria – the Port of Bourgas, Bourgas-Alexandropolis pipeline, Danube bridge 2, Struma highway, Sofia Metropolitan, etc.

The members of the department have managed and taken part in the implementation of many scientific and scientific and methodical assignments, in the prospecting and designing of big construction sites and strengthening of landslides. Some of the most significant are:

- Hydrogeologic study of the underground waters and elaboration of hydrologic maps in scale 1:25 000;
- Methodology for hydrogeologic study of the qualities and quantities of underground waters and their categorization according to the degree of pollution and suitability;

- Development of universal methods for forecasting the migration of pollutants in the underground waters and definition of the migration parameters;
- Improvement of the methods for prospecting of the geothermal deposits and designing of borehole systems for their exploitation;
- Methodology for forecasting the pollution of underground waters from dumpsites;
- Development of methodology for monitoring of the underground waters in Bulgaria;
- Methodology for hydroecological studies and forecasts after clearance of the geotechnological mining of uranium;
- Definition of the resources of the underground waters (a methodological guide);
- Hydrogeological map of Bulgaria in scale 1: 500 000;
- Methodology for engineering and geological monitoring of dangerous geodynamic phenomena;
- Engineering and geological and hydrogeological studies for a depot of radioactive wastes from the Nuclear Power Station Kozlodui;
- Engineering and geological study of Sofia Metropolitan;
- Enlargement of the Sofia Airport;
- Construction of Danube bridge 2.

The practical training in the department is carried out through practice seminars with the students from two degree courses – Hydrology and Engineering Geology and Applied Geophysics. The practice seminars for the students in Hydrology and Engineering Geology are carried out at the specially constructed base in the village of Lyutibrod where there is a system of wells for experimental and filtration studies and equipment for field defining of the physical and mechanical properties of the construction soils. Another practice seminar for the students in Hydrology and Engineering Geology and Applied Geophysics is the educational excursion in regional engineering geology and underground waters in Bulgaria. The educational excursions allow the students to get acquainted with the conditions for the building of bigger construction sites, strengthening of landslide terrains and borehole wells and springs.

APPLIED GEOPHYSICS DEPARTMENT

The Department of Geophysical Methods of Prospecting at the Faculty of Geology was created in 1953. In 1983 the department was included in the new nomenclature under the name Applied Geophysics.

After its establishment the department was consecutively headed by: Prof. Grozdan Nikolaev (1953-1956), Prof. Lyuben Dimitrov (1957-1968), Prof. Toma Dobrev (1969-1988), Prof. Vera Ivanova (1989-1993), Assoc. Prof. Ivo Lozenski (1994), Prof. Vera Ivanova (1995-1998), Prof. PhD Radi Radichev (1999-2007), Assoc. Prof. PhD Stefan Dimovski (since 2008).

Currently, the department consists of 1 professor, 4 associate professors and 2 assistant professors:

- Prof. PhD. Radi Radichev
- Assoc. Prof. PhD Lyuben Gugov
- Assoc. Prof. PhD Chavdar Gyurov
- Assoc. Prof. PhD Stefan Dimovski
- Assoc. Prof. PhD Alexander Tsvetkov
- Ass. Prof. Hristian Tsankov
- Ass. Prof. Miglena Yankova

The academic and research work at the department is supported by Eng. Nikolai Kirilov and Eng. M.Sc. Svetla Dimitrova.

The academic staff of the department have published more than 1000 scientific papers, 7 monographs, 13 textbooks and 5 manuals for practice seminars. The department has several laboratories – Physical Properties of the Rocks, Gravimetric and Magnetic Methods in Geophysics, Electrical Prospecting and Drilling Geophysics, Radiometry and Nuclear Geophysics.

The department trains students in the degree course Applied Geophysics as well as other Bachelor and Master Degree courses at the Faculty of Geology. Five Master Degree courses exist – Applied Geophysics, Prospecting Geophysics, Petroleum Geophysics, Natural Risks, Geophysical Study of the Earth and Planets. If necessary, training can be provided in other up-to-date fields of applied geophysics – e.g. Engineering Geophysics, Mining Geophysics, etc.

The personnel development in the department is traditionally targeted in two main directions:

- attracting of young specialists to become members of the academic staff;
- scientific development of the academic staff – preparation of PhD theses for the assistant professors, preparation for habilitation as associate professor and professor.

An important element for the development of the educational content is the systematic updating of the logical interrelations between the different disciplines in the educational curriculum. This is also the main prerequisite for the purposeful updating of the educational programmes for the specific disciplines.

The Applied Geophysics Department has always had international cooperation within direct contracts with geophysical faculties and scientific units at the Moscow Institute of Geology Prospecting, Moscow Institute of Oil and Gas, the International Scientific Research Institute on Management Issues, Moscow, the Section on Mining Geophysics at the Mining Institute of the Russian Academy of Sciences, the Freiberg Mining Academy (Germany), the Department of Geophysics at the Polytechnic University, Mishkoltz, Hungary, etc.

The priority areas of research in the department are mainly targeted at:

- Improvement of the educational process – educational programmes and curriculum, practical training, forms of examination, etc.
- Analysis and interpretation of the data for the study of the in-depth structure of the Earth and study of separate territories and regions in relation to the search and exploration of minerals and solving of different tasks in relation to the geological profile.
- Research in the field of engineering geology, mining, construction, ecology and all aspects related to forecasting of natural and technogenic risk situations.

DRILLING AND OIL AND GAS PRODUCTION DEPARTMENT

The Drilling and Oil and Gas Production Department has been existing since the establishment of the University of Mining and Geology “St. Ivan Rilski”. Its first head was Assoc.Prof. Pavel Troski – 1956-1958. After 1958 the department was consecutively headed by Prof. Stefan Ognianov (1958-1979), Prof. Dimo Yordanov (1979-1990), Assoc.Prof. Varban Arizanov (1990-1995). Since 1995 the head of the department has been Assoc. Prof. PhD Lyubomir Gerov.

Currently, the Drilling and Oil and Gas Production Department consists of 10 employees – 4 associate professors, 5 assistant professors and one chief expert.

Assoc. Prof. PhD Lyubomir Gerov
Assoc. Prof. PhD Georgi Kirilov Nikolov
Assoc. Prof. PhD Shteryo Kostadinov Lyomov
Assoc. Prof. PhD Valeri Nikolov Zlatanov
Ass. Prof. Rumen Kulev Kulev
Ass. Prof. Ivan Borisov Todorov
Ass. Prof. Martin Minkov Boyadjiev
Ass. Prof. Milko Harizanov Harizanov
Chief expert Dimitar Ivanov Markov

The students are trained in the degree course Drilling and Oil and Gas Production which is among the basic degree courses at the Faculty of Geology. Initially it was called Prospecting Techniques. However, with the increase of the educational content and profile of the trained specialists, in 1972 it was renamed to Drilling

Techniques and Technologies and in 1992 it was renamed once more to Drilling and Oil and Gas Production within professional field – **Research, Mining and Processing of ores and minerals, code 5.8.**

The training curriculum, the content of the educational material and the field of realization for the graduates from this degree course are closely related to the degree courses Petroleum Engineering and Drilling Engineering which are studied in a relatively small number of specialized universities in Europe and America.

Since its creation more than 820 specialists have graduated in full-time and part-time studies from this degree course.

At present such specialists are very much sought around the world and all graduates can find their professional realization in the country and abroad. Our engineers in drilling and oil and gas production acquire high quality fundamental, general and special theoretical knowledge combined with contemporary practical skills, knowledge and communication possibilities.

The department provides also four Master Degree courses in: Drilling and Oil and Gas Production; Exploration Drilling; Mining, Transportation and Storage of Oil and Gas, and Gas Supply.

The training curricula for the Bachelor and Master Degree courses foresee the organisation of practice seminars and internships which are carried out according to the signed contracts for cooperation between the UMG “St. Ivan Rilski” and related companies such as Oil and Gas Exploration and Production – Sofia (Dolni Dabnik, Butan, Tyulenovo, Selanovtsi, Dolni Lukovit, etc.), BulgarGas EAD – Sofia, Overgas AD, Petreko Ltd. Over the last years our students can develop their theses and internships in foreign companies abroad such as Devico AC, Norway. Swiss (Sandvik) and French (Foraco) companies are also interested in working with our students.

For training and research purposes the department disposes of a well equipped laboratory and a Centre of Gas Technologies, hardware and software products.

The department trains Ph.D. students in 3 scientific fields. 29 theses were defended, some of them of foreign specialists. A large number of engineers, specialists and Ph.D.s from Iraq, Angola, Syria, Lebanon, Sudan, Benin, Jordan, etc. have graduated the Drilling and Oil and Gas Production degree course.

The **research activity** in the department is quite varied. Our lecturers have participated as managers and experts in the development of more than 300 scientific and applied assignments. The department’s members have more than 76 innovations, some of which are used with significant economic effect. The department has also contributed to the creation of facilities for exploration drilling and drilling of oil and gas, equipment and technologies for the application of gas and liquid systems for drilling and production of oil and gas, modeling of the processes for oil production, development of technical means for exploration drilling.

Traditionally, the students are actively involved in the educational and research work in the department. They prepare course assignments and projects contracted by Bulgarian and foreign companies working in the field.

Our academic staff have participated in many scientific fora in the country and abroad, they have published 7 monographs, 13 textbooks and teaching aids, and more than 290 publications.

The department is also represented at the Special Scientific Mining Council at the Higher Attestation Commission.

Our graduates have found their professional realization in companies such as: Oil and Gas Exploration and Production – Sofia, BulgarGas EAD – Sofia, Overgas AD, Geology, Exploration and Design – Varna, Petrogas-Antika – Montana, Bulgarian Drilling Company Ltd. – Sofia, Gastek-Bulgaria Ltd., Petreko Ltd – Varna, Tassi Ltd., Black Sea Technology Company AD – Varna, Prima Gas AD – Varna, Navan Ltd. – Chelophech, “Sofgeoexploration” Ltd, Sofia; Geolint – Sofia, Maritsa Iztok Mines EAD and many other design and exploration companies. More than 40 young graduates from the last years work now in these companies.

DEPARTMENT OF ENGINEERING GEOECOLOGY

The Department of Engineering Geoecology was created in 1992. In the period 1992-1996 the education was provided for a degree course in Engineering Geoecology. Since 1996 the degree course has been renamed to Ecology and Environment Protection. The first graduates “engineer-geoecologists” were in 1998, the first Bachelor graduates from Ecology and Environment Protection were in 2002. The Biotechnology degree course was created in 2003.

Currently, the department has 8 members of the academic staff:

Assoc. Prof. PhD Tsvetan Mitrov – Head of the Department

Ass.Prof. Plamen Simeonov Georgiev

Ass. Prof. Anatolii Tsankov Angelov

Ass. Prof. Svetlana Georgieva Bratkova

Ass. Prof. Marina Valentinova Nikolova

Ass. Prof. Katerina Tatyana Nikolova

Ass. Prof. Alexander Rumenov Lukanov

Visiting Ass. Prof. Irena Ilieva Spasova

Chief expert Ani Bogdanova Stefanova

The Bachelor Degree course has a curriculum with more than 20 specialised, general and foreign language disciplines. The number of our Bachelor graduates is more than 600.

The Department also has a Master Degree course in Ecology and Environment Protection which builds on the Bachelor degree course in Ecology and Environment Protection and a Master Degree course in Biotechnologies which builds on the Bachelor degree course in Biotechnologies.

The Department disposes of well equipped laboratories for educational and research work, laboratories of microbiology, ecology, mineral technologies, biotechnologies, analytical chemistry, a greenhouse and a vivarium as well as a site and hall with installations for pilot experiments.

Among the most important **equipment** of the Department are:

- Spectrometers for induced connected plasma and atom absorption;
- Systems for highly sensitive liquid chromatography;
- Fermentors and bioreactors for aerobic and anaerobic leaching, lizometers, centrifuges, different spectrometers, microwave digester, automatic titrators, etc.

The **pilot experiments** are carried out in:

- A special site with artificial swamps, permeable reactive barriers, alkalisated drainages, rock filters, sites for leaching of mineral raw resources and for purification of soils and compost systems;
- A greenhouse;
- A vivarium with rich collection of exotic and local birds, fish, reptiles and mammals.

The **research work** of the department is reflected in more than 200 research projects, many of which involve international cooperation. The main fields are related to:

- Purification of waters polluted by radionuclides, heavy metals, toxic elements (As, Sb) and organic compounds (including crude oil and oil products);
- Purification of soils polluted by radionuclides, heavy metals, toxic elements (As, Sb) and organic compounds (including crude oil and oil products);
- Monitoring and prevention of the generation of sour ore waters;
- Reclamation of broken ecosystems including post mining landscapes;
- Recycling, storage and use of domestic, agricultural (production of biogas) and industrial waste including those from mining works;
- Study and protection of the bio diversity of different water and terrestrial systems;
- Biological use of the mineral resources (bacterial leaching of ferrous metals and uranium from ores and spoil heaps in situ, preliminary bacterial oxidizing of sulphide ores and concentrates

containing gold, combined microbial and chemical leaching of gold from oxide ores, microbial separation of iron from quartz sands and china clay, of sulphur from coal, of phosphorus from iron ores, improvement of the ceramic properties of china clays, microbial stimulation of the oil production);

- Stimulation of the soil forming process and soil fertility;
- Alternative sources of energy – bio fuels, biogas, waste biomass, etc.;
- Monitoring of ecosystems;
- Environment Impact Assessment of ore sites.

The main achievements of the academic staff of the department are related to the construction of:

- Installation for bacterial leaching of copper from the deposits in Vlaikov Vrah mine in 1980s;
- Installation for combined biological and chemical leaching of gold from oxide ores in 1996-1997 in Elshitsa mine;
- Permeable multi-barrier for purification of sour ore waters in Kurilo deposit;
- Rock filter for separation of manganese from polluted waters;
- Different multi-barriers based on processes such as microbial dissimilation sulphate reduction, biosorption, chemical neutralisation and biological oxidation used in different combinations;
- System for simultaneous purification of soils polluted by heavy metals and oil;
- System for prevention of the generation of sour ore waters through combined application of alkalis and organic substrates.

The Department has international cooperation with partners from Europe and America – the Technical University in Cottbus, Germany, Athens Polytechnics, Greece, Warsaw University, Poland, Bureau for Geological and Mining Research, Orlean, France, the University of L'Aquila, Italy, the Technical University, Ostrava, the Czech Republic, the Technical University, Kosice, State University of Michigan, the USA, the Institute of Microbiology at the Russian Academy, Moscow, Liege University, Belgium, the Centre for Scientific Research – Flanders, Belgium, the Technical University, Wroclaw, Poland, Kuprum Institute, Wroclaw, Poland, the Institute of Geological and Mining Research, Athens, Greece, the University of Lund, Sweden, Innsbruck University, Austria, Banger University, Wales, UK, Petrosani University, Romania, the Technical University, Dresden, Germany, Freiberg Mining Academy, Germany, the University of Belgrade, Serbia, the Centre of Scientific Research, Rio De Janeiro, Brazil.

DEPARTMENT OF PHYSICS

The Physics Department was established at the Faculty of Geology in 1953 inheriting the same department at the State Polytechnics. Its first head was Assoc. Prof. Neno Ivanchev, who taught physics to students from all degree courses. The department was consecutively headed by Prof. Petar Paunov (1956-1967), Assoc. Prof. Ivan Baev (1967-1993), Assoc. Prof. Lilyana Drazheva (1993-1999).

Currently, the department consists of:

Assoc. Prof. PhD Vili Lilkov – Head of the department since 1999

Assoc. Prof. PhD Nikolai Djerahov

Ass.Prof. PhD Kalinka Velichkova

Ass.Prof. PhD Plamen Savov

Ass.Prof. PhD Maya Vatskicheva

Ass.Prof. Yulia Ilcheva

Physicist Dimitar Dimitrov

Eng. Radko Valkov

Technician Diko Uzunov

Secretary Jivka Angelova

The Department of Physics provides training in General Physics to students from all degree courses in the UMG, full-time and part-time studies, and in Atom and Nuclear Physics to students from the degree course in Applied Geophysics.

The educational process takes place in specially equipped training laboratories in General Physics and Atom and Nuclear Physics. The training follows the material in textbooks and teaching aids published by the academic staff of the department – textbooks on Physics, I and II part, textbook on Atom Physics and textbook on Nuclear Physics, Methodological guide for problems in physics, Guide for laboratory seminars in General Physics, Guide for laboratory seminars in Atom and Nuclear Physics, Collection of General Physics Problems. The department has well equipped computer class and its own storage depot for training and scientific equipment.

The research activity of the Physics Department is quite diversified and is defined by the professional interests of its academic staff. Since its establishment more than 600 scientific articles have been published, hundred research topics and 23 innovations have been made. As of 2008 a Research Laboratory of Phase Methods and Radiography Structural Analysis has been functioning at the department.

The main fields of research work of our academic staff are related to hard bodies physics; semi-conductors physics; experimental nuclear physics; physics of high and ultra high vacuum and physics of the interaction of polarized neutrons with ferromagnetic materials, atmosphere physics, and physics teaching methodology.

The members of the department work in scientific fields specific for the activity of the UMG – the problems of optimising the process of ore grinding and selective opening up of minerals, petro-physical properties of the rocks, methods for separation of the iron from the china clays, study of the physico-mechanical properties and hydrate products of cements with mineral additives, etc.

MUSEUMS

MUSEUM OF MINERALOGY, PETROGRAPHY AND MINERAL DEPOSITS

The Museum of Mineralogy, Petrography and Mineral Deposits was created in 1961 as a collection of minerals, rocks and mineral deposits and has been used for the training of the students. In 2008 the Museum was transferred under the auspices of the Faculty of Geology as Academic Museum Collection. It has educational, training and scientific aims. It is situated in a specifically designed exhibition hall of 280m². Minerals, rocks and mineral deposits from all Bulgarian deposits and samples from more than 50 countries in the world are exhibited in the museum. There are large collections from Russia, Germany, the Czech Republic, Slovakia, Brazil, China and Australia. The museum fund contains 12 378 samples, 11 526 of which in the main collection and 852 in storage. The main collection hosts 9235 samples from Bulgarian deposits. All samples are systematized according to the classifications adopted in the educational process which makes the museum instrumental in the training of the students and provides for the implementation of a wide range of scientific and research work. Its various collections are connected with the names of more than 82 professors, associate professors and lecturers, 14 of which come from abroad, as well as with more than 30 geologists, graduates and students. Each year the fund is enriched with donations from lecturers, students and guests of the University, donors and friends of the Faculty of Geology as well as through exchange with other museums in the world.

The **Mineralogy** Exhibition has unique samples such as the “Giant calcite crystals” from the region of Bourgas, the “Agate” collection from the region of Kurdjali, Shumen and other Bulgarian deposits. More than 662 mineral varieties and types are registered in this exhibition. The museum disposes of a rich collection of quartz varieties, the longest opalised tree, geode from amethyst, and a wonderful collection of Bulgarian agates. The collection “Donation Iliya Deleff” of varieties of quartz and precious minerals from Brazil has a special place in the museum.

The **Petrography** Exhibition includes all types of igneous, sedimentary and metamorphic rocks. This is the most representative petrographic collection for Bulgaria. There are samples of the most famous volcanoes in the world, limestone from Mount Everest, Himalayas, Nepal, and gneiss from the deepest borehole in Russia. A special collection of facing rock materials is exhibited in the museum.

The **Mineral Deposits** Exhibition has a complete genetic classification of deposits of ore and industrial minerals (genetic series, groups and classes) and a special subsection – structures. A scale model of “Samokov” is exhibited in the museum. The main function of the museum is to show the wide mineral variety of Bulgaria and to preserve its rich mineral and ore heritage. The museum is a representative holder of the different resources available in the country. It holds exhibits from deposits which had already been depleted, which are being mined now and from personal collections of most of the lecturers at the University. Special regional collections are also being shown: Barite-Iron ore deposit Kremikovtzi and Minerals from the lead-zinc deposits of the Rhodope Mountain.

The different exhibitions - Mineralogy (with crystallography), Petrography, Mineral deposits, Gem and decorative minerals – complement each other. The museum has also a Souvenir collection and a collection of minerals and rocks which can be purchased.

MUSEUM OF GEOLOGY AND PALEONTOLOGY

The foundations for the Museum of Geology and Paleontology at the Geology and Paleontology Department were laid in 1953 with the establishment of the University of Mining and Geology. However, the first fossil collections dated from the establishment of the Engineering Geology Department at the former Polytechnics with samples before the Second World War. For five decades the museum collections had been expanded

with materials from Bulgaria and many other countries in Europe and around the world. In this aspect the efforts of the founders of the Department headed by Prof. Stefan Bashev should be acknowledged.

The official opening of the museum took place in 1961. The Museum of Geology and Paleontology is one of the largest specialized museums in Bulgaria and its collections could be matched only with those of the Museum at the Sofia University "St. Kliment Ohridski" and the National Museum of Natural History. The main purpose of the exhibits is the education of the students through visualization of fossils and rocks. This is the biggest and most representative training hall in fundamental geological sciences and is visited by students from the three faculties of the university during their lectures and seminars.

Three permanent exhibitions are exposed in the museum – Paleontology, Historical Geology and Geology of Bulgaria. Smaller collections of the main types of rocks in General Geology and Structural Geology are also available, as well as collections of contemporary samples from the Caribbean basin and from the Bulgarian expeditions in Antarctica. The monographic collections are the most valuable ones - Jurassic *Bellemnites* - Prof. Vergilova, Neogene Bivalves- Prof. Strashimirov, Paleogene and Neogene flora - Assoc. Prof. Vatshev, etc.

The Paleontology exhibition is arranged according to the biological nomenclature. The most representative samples are exhibited. In addition representatives of the same fossil groups used for recognition are arranged. Following the best traditions of the Geology and Paleontology Department the museum collections are constantly enlarged by the academic staff. This museum is capital not only of the Faculty of Geology but also of the whole University.