

# Fostering talents for the future with a stress on field practice



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It is the mission and obligation for institutions of higher learning to involve themselves in social and economic development. China University of Petroleum in Beijing (CUPB) has always dedicated itself to fostering technological and engineering talents for the petroleum and petrochemical industry by meeting the needs of the industry, by initiating innovative programmes and especially by strengthening field practice, collaborating with enterprises and building a strong faculty. In this respect CUPB has made great efforts and much encouraging progress along the way.

The lack of field practice has always been the weakest component in higher engineering education. So CUPB has made consistent efforts over the years to build a field practice system with the core aim of improving students' innovation and creativity through practicum (work placement) teaching, work field practice training and scientific research.

Field practice sessions are included in the courses of all major programmes. In doing this, we have paid special attention to taking into consideration the characteristics and realities of each programme, so that the field practice sessions can cover all the major components or areas of the programme. For professional master programmes, the courses offered are the result of discussions and consultations among

three parties – CUPB supervisors, technological experts and on-site supervisors from the corporate sector, thus establishing a curriculum system based on basic theory plus programme-specific modules. At the same time, senior technological experts from companies and researchers from home and abroad are invited to give case-study or state-of-the-art lectures, aiming to bring students nearer to research frontiers, foster their engineering application capabilities and broaden their international horizons.

Besides the simulation training conducted on campus, CUPB has been sticking to the principle of "authenticity" – putting students through real tests in authentic environments – as an important aspect of engineering education. For the undergraduates on the Outstanding Engineers Programme – part of China's 'national outstanding engineers initiative' sponsored by the Ministry of Education and the Chinese Academy of Engineering – they will finish their graduation project in the enterprises. For the postgraduates on the professional master's programmes, their field practice will be done mainly in the high-level field practice centres jointly established between the university and the enterprises. These centres provide an extensive range of field practices in engineering, covering R&D, engineering design, engineering technology application and technological processes, offering a platform and support for the promotion of students' innovative and practical capabilities.

It is our principle to combine practice and scientific research. In order to make full use of its strengths and resources in key disciplines, CUPB has made all laboratories open to undergraduates free of charge, so that they can have access to these laboratories and participate in research projects. In the past two years, more than 70 per cent of the graduation theses are relevant to their supervisors' research projects and for those related to key petroleum subjects, the figure can be as high as 90 per cent. We have also created a series of brand competitions, like the National Petroleum Engineering Design Contest and the SPE Quiz, to combine study, contest and research,

*The campus of China University of Petroleum – Beijing*





thus establishing a comprehensive field-practice platform by incorporating application, innovation and communication.

### Strengthening company collaboration

CUPB has made great efforts to promote in-depth involvement from enterprises in developing talent and has adhered to the principle of fostering talents jointly with the industry and the research institutions. This offers companies three degrees of involvement. Two courses offer enterprises full participation. One is the Tailoring Solutions Programme, whose curricula are tailored to the needs of the employer with whom the students will sign a recruitment contract in order to work for the employer after graduation.

The other is the International Cooperation Programme, aimed at fostering talents with global perspectives. In some cases, students are exposed to English-speaking teachers, lectures and textbooks and will do their thesis in English. In others, students will learn another foreign language such as Russian, Spanish, Arabic or French, and then do their studies in a contracted university in a target country.

By full participation, enterprises involve themselves in the whole educational process – selection, education, examination and employment. In the Tailoring Solutions Programme, CUPB works out customised programmes jointly with the enterprises by adding or altering some courses and strengthening field practice sessions so that the programmes or students are tailored to the needs of various employers. This helps meet enterprises' demand for badly-needed talent.

A form of more partial participation by companies is the establishment of joint research centres for postgraduates within the enterprises themselves, with students assigned to do their theses or graduation projects in these research centres. Since 2000, CUPB has established such joint research centres and started master programmes in more than 50 petroleum or petrochemical enterprises which undertake state key scientific research projects and which enjoy good reputation and conditions for fostering talents. CUPB invites experienced senior researchers and high-level academic experts to be on-the-site co-supervisors in these company research centres. This not only helps students develop practical innovative capabilities but also helps students have a better understanding of

the enterprises. Quite a number of students have chosen to work for them after graduation and the companies can also take this opportunity to screen and select potential employees. Evidence shows that joint research centres are an effective way to foster high-level engineering talents.

Finally, enterprises can participate indirectly by sponsoring scholarships and lectures, naming classrooms, and by taking part in academic exchanges with researchers or in part-time or guest professorships for senior company executives – in short, mounting a display of corporate culture on campus.

### Forging a strong faculty in engineering

A strong faculty, experienced in engineering is key to fostering high-quality engineering talents. Therefore, CUPB has adopted a series of policies in teacher recruitment and further education to enrich their engineering experience in the faculty, especially among the newly-recruited teachers. Post-doctoral study is compulsory for new teachers. All would-be teachers will have to do a two-year post-doctoral study – doing teaching and research at a post-doctoral station in the university or in a contracted enterprise – before signing an employment contract with the university.

As teaching assistants, newly-employed teachers will have to supervise at least one undergraduate field practice trip to help themselves acquire a better practical understanding of engineering field practice.

CUPB has also optimised its faculty structure by drawing on not only teachers on the faculty but also guest teacher/expert resources: the teachers on the faculty are mainly responsible for theoretical and laboratory work, while guest teachers from enterprises do engineering case studies, and foreign experts give state-of-the-art lectures and help bring students to the frontiers of research.

Evidence reveals that this in-depth involvement of enterprises in engineering education is not only beneficial to the fostering of talents but also to better meeting the needs of the development of the petroleum industry. The rate of employment for CUPB graduates on petroleum-related programmes remains above 95 per cent and CUPB graduates have received positive comments from employers. The benefit for the enterprises is that they can find and select more easily the talents that they are so badly in need of. ■