

Best Practice 1

1. Title of the Practice

Experiential Training and Mentoring for overall development of the students.

2. Goal

The subjects taught in the Institute, viz. Life/Bio-sciences and Earth science (Geology) are highly interdisciplinary in nature. It is necessary to nurture the students in these interdisciplinary areas to broaden the scope of their knowledge and to develop professional approach. First and foremost, the Institute aims to introduce to the students, the knowledge resources available in the Central Library that span across various disciplines and types of resources. In order to make the students understand the interdisciplinary nature of the programmes being taught, the Institute has the objective of organizing visits of the students to the various departments and laboratories in the Institute and encourage the students to interact with faculty of other departments. Moreover, the Institute also aims to provide opportunity for students to take up interdisciplinary research projects. In addition to their classroom and laboratory training in the concerned subjects, the students must be exposed to real world/on-site scenarios to develop integrative approach/strategy and imbibe application oriented approach. Hence, the major goal of the Institute is to encourage experiential training through arranging various activities, viz. summer projects, industrial trainings, independent handling of research projects, self-designed seminars, participation in National and International conferences, field visits, mine training, hospital demonstrations, industry/institute visits, etc. Moreover, considering the need to qualify various competitive examinations for future prospects, it is necessary to take up competitive exam training and skill development initiatives. Further, since all PG programs have laboratory component, the Institute also aims to inculcate analytical, interpretative ability, aptitude, ability to design laboratory experiments and solve problems. Lastly, an important goal of the Institute is to bridge the gaps in practical and numerical skills and orient students for integrative approaches to understand concepts.

3. The Context

The students admitted in the Institute are mostly from economically and educationally under privileged Marathwada region. Although meritorious students seek admission to the programmes offered by the Institute, they are unaware of their in-built talent and skills. Due to the lack of academic exposure and career prospects, they cannot decide about their career goals and the utility of the subject in which they are trained. Moreover, the students are reluctant in opting the academic career through National/Global level competitive examinations. The Institute has developed extensive pre-admission counseling mechanism to reduce/remove the fear and phobia about higher studies and assist in choice of subject at M.Sc. level. Mere classroom teaching does not effectively eliminate the senile attitude towards their career honing. Therefore the Institute has seriously addressed this problem by designing multi-directional approach that caters self-learning; developing interest, using interdisciplinary, integrative and object-oriented strategy in learning; broadening of knowledge grasp; analyzing situations and inculcating problem solving/solution finding attitude.

4. The Practice

- At the beginning of every academic year, a visit to the central library is arranged under the aegis of the IQAC for M.Sc. Part I students. Here, students are exposed to the knowledge resources available in the Central Library, i.e. reference books, text books, collection of rare books and volumes, abstracts, reviews, science magazines, journals and periodicals, etc.
- Students are encouraged to visit other departments and interact with faculty of the various departments in order to gain knowledge from various disciplines/subjects to get better insights of their own subject. Department of Microbiology organized visits of the M.Sc. I students to the other departments and facilities within the Institute with the aim of providing them additional knowledge about the laboratory facilities and expertise of other departments.
- Interdisciplinary research projects provide opportunity to the students to broaden the scope of their research and utilize the expertise and infrastructure available in other departments for realizing the objectives of the projects.
- Students are encouraged to put forth questions on a topic in the class and then find out the answers on their own prior to start of teaching of the topic. The adopted method of cross evaluation of internal exam answer papers by student peers encourage setting up of appropriate high rubric level ultimately conveying students the ideal way of answering papers. This has resulted in students becoming very honest in evaluating themselves.
- Explaining concepts orally to audience facilitates a deeper understanding of the subject. Knowledge dissemination always catalyzes the knowledge grasp. Keeping this in mind, the Institute motivates the students to design and deliver information/concept-based seminars during their curriculum. Students are given the flexibility to deliver seminars based on topics from within the prescribed syllabus, allied areas of prescribed syllabus, or research papers. Students are encouraged to present research papers published in journals followed by discussion on the paper. Faculty members encourage students to understand research planning, design and interpretation and to find out what more could be done to enhance outcome of the research. The display of synopsis, presentation skeleton, overall organization of the seminar events, evaluative feedback/interactive discussion is completely managed by the students which self-mentors their leadership qualities. Faculty members guide the students for improvisations.
- Motivating students to undertake science activities under the banner of Students' Clubs ignited the spark and led to organization of various activities by students. The Students' Council of Biotechnology Department organized a Poster Competition on the topic "Immunology", speech competition on the occasion of "Biotechnology Day" and a debate competition. MicroCosm- Students' Club of Microbiology organized Intercollegiate Research Paper Presentation Competition on the 197th Birth Anniversary of Sir Louis Pasteur, National Science Day celebration, Seminar and Interactive Session on Summer Research Fellowship Program-2020 by a successful PG student and a seminar on toxicology by a Senior Scientist from USA.
- Students as "Student Mentors" are encouraged to explain concepts or short topics in the class to enhance their own understanding of the particular topic and boost the interest and understanding of other students in the class.

- Faculty members of other departments in the Institute are invited to engage 1-2 lectures on topics of their expertise. This increases collaborative teaching in the Institute and also offers in-depth knowledge to the students on particular topic/s. Faculty members are encouraged to organize lectures of eminent scientists, experts, professionals and alumni to provide students with a glimpse of current trends in scientific research. Heads of the Departments are encouraged to collaborate with research and Academic Institutes through linkages and MoUs and formulate the structure of MoUs, keeping in view collaborative research activities, expected mutual benefits and interests of the students and faculty members; however, without any financial commitment from the Institute.
- In order to motivate students and honour them for the performance in final year PG examination, Department of Botany under the aegis of the alumni awarded Prin. S. P. Nanir Gold Medal to the M.Sc. Part II Department Topper in the subject of Botany.
- In a significant effort for student facilitation, the Department of Geology organized Pre-Ph.D. course for all students enrolled for Ph.D. in Geology at the affiliating University.
- In order to boost the competitiveness amongst students, a National Level Microbiological contest, National Level MicroBioCanvas competition and National Level Microbiolympiad Competition were organized by Department of Microbiology with a total participation of 2427 students. Winners were awarded prize money, certificate of excellence, medal of honour, trophy and subscription to Bioresku Study Package.
- Students are oriented for developing problem-solving abilities by providing them an opportunity to design the laboratory practical, keeping in mind the various possible outcomes, interpretations and fulfilment of the goal/s.
- In order to promote learning through observations, conceptualization & concept delivery and collaborative thinking, faculty of Biotechnology Department adopted newer innovative models of teaching, viz. cross over teaching (educational trip), learning through flipped classroom (students develop concept from resources provided and deliver to the class) and teaching through collaboration (students work together on group assignments).
- The linkage between classroom learning and field-experience is established through regular visits to industries, research institutes, hospitals, mines, field visits, etc. Here, the students explore new dimensions in the practical application of the subject knowledge. Exhaustive interactions on varied queries by the students with field experts stimulate thirst for learning.
- The Institute strongly believes in enrichment of teaching-learning process using research based approach in concerned subjects. As a consequence the students are allotted with mini-research projects as a part of academic curriculum. Students develop research aptitude by familiarizing with research methodology, analytical tools, data analysis, interpretation skills, numerical skills and presentation skills while implementing these projects independently.
- Students are motivated to undertake summer projects/in-plant training in various organizations/industries/research laboratories outside the Institute, to give them first-hand experience of the organizational settings. They get familiarized with latest

trends, quality principles, processing techniques, instrumentation, need for documentation and documentation procedures.

- Students are given the opportunity to observe/participate in certain consultancy projects undertaken by faculty members, wherever possible., under close supervision of concerned faculty. For example, M.Sc. Part II students of Geology Department carry out certain tasks assigned by faculty in the ground water analyses under strict supervision. Students of Biophysics Department are demonstrated the procedure of Genetic Purity Testing by Gamma-irradiation which is a part of consultancy work.
- Students participate enthusiastically in National and International conferences, present research papers/posters, interact with the scientific community and develop contacts that may be useful in their future endeavors. This helps in building up their confidence, will-power and morale.
- Every year, students are mentored thoroughly and encouraged to participate in Avishkar Competitions. PG as well as Research students are provided assistance from selection, planning and execution of research work to the final presentation/s.
- Real life/on-site experiences shared by the invited experts, faculties, scientists, entrepreneurs, industry personnel and our alumni with our students culminate in imbibing ethical values and personality traits viz. pride towards the Institute, down-to-earth analytical approach, methodologically buffered strategy, descriptive & illustrative approach.
- Exam skill and experience sharing by alumni who have successfully qualified the competitive examinations developed a positive attitude amongst the students. “Walk-the-talk” organized by the Biotechnology Department is one such is one such student-centric activity aimed at enhancing the interaction between the current students with the alumni. Students have since then opted enthusiastically to appear in the NET/SET/GATE and other competitive examinations. The faculty members also provide in-house guidance to the students for competitive examination preparations.

5. Evidence of Success

- As a result of the devotion and sincere efforts of faculty members towards teaching-learning-research, the Institute attracts meritorious students to take admission in the various PG programmes of the Institute. This is evident from the fact that top ranking students in the PGCET conducted by the affiliating University secured their seats in the Institute in 2017-18 and 2018-19.
- Seminars presentations have enriched the qualities within the students, viz. gathering the information, designing the talk/presentation, preparing the display slides using computers, co-assisting the presentations with animations, simulating examples, boldness, confidence, clarity of thoughts, integrating information and logic of bridging the concepts, communication skills, analyzing the questions raised and giving appropriate answers, effective use of audio-visual devices and white-board. As a result students could confidently present papers in conferences and interact with scientific community.
- The initiatives taken by students’ clubs to organize various programmes helped develop their communication skills, event management skills and interaction with experts in the field. The programmes made available a platform for students to share research themes/works amongst students for nurturing the scientific attitude, enhance

competitiveness, involve budding microbiologists and biotechnologists in exciting field of life sciences, apply the biological principles and concept in problem solving and help students understand and appreciate the nature/function of microbes.

- Inter-department interaction of students with faculty members enhanced collaborative teaching in the Institute and offered indepth knowledge to the students on particular topic/s. Students benefitted from academic and professional linkages with other organizations in the form of trainings, student visits, guest lectures, etc. Organization of student visits to the other departments and facilities within the Institute provided them additional knowledge about the laboratory facilities and expertise of other departments. It was also useful to them for research projects in the final year.
- The newer innovative models of teaching, viz. cross over teaching, flipped classroom and teaching through collaboration resulted in more active participation of students in learning through team-work and discussions.
- The award of Prin. S. P. Nanir Gold Medal to the Department Topper in the final year examinations inspired students to prepare and perform well in the examinations and the award created a sense of pride for the awardee.
- In the Pre-Ph.D. course for Geology research students, a total of 25 students of the affiliating University were benefitted.
- Organization of National Level Microbiological contest, National Level MicrobioCanvas competition and National Level Microbiolympiad Competition and awarding the winners with cash prizes, certificates, medals, trophies and subscriptions had a catalyzing effect on other students who got inspiration to participate in similar activities in the future. The Awardees were empowered upon receiving the various awards in the competitions.
- Individual mentoring to the students, both by Guiding Faculty and the Avishkar Co-ordinators resulted in students getting success in the Avishkar competitions and selection to participate at the higher levels of the competition. PG as well as research students achieved success in Avishkar competitions.
- The knowledge acquired through field exposures, summer projects and research projects could successfully amalgamate the theoretical concepts with practical utility which further assisted them in diagnosing and curing the problems/challenges faced in actual work environment. As a result students had a chance to be in vicinity with National and Global experts in research laboratories/industries from whom they could build their personality and contribute significantly to the growth of their organizations. The coveted positions held by alumni highlight the result of these efforts.
- Moral boosting lectures by alumni/invited experts sharing real life/on-job experiences has thoroughly revolutionized the students' mind with strong will to undertake/handle tough challenging situations. The students visualize and follow these mentors as their Role Models and as a result there is boost in the placement percentage within last couple of years.
- The in-house coaching for competitive examinations has elevated and strengthened the confidence in successful tackling of the National level competitive examinations. "Walk-the-talk", organized by Biotechnology Department, for enhancing the interaction between the current students and alumni resulted in students opting

enthusiastically to appear in the NET/SET/GATE and other competitive examinations. In-house guidance for competitive examination preparations has elevated and strengthened the confidence in successful tackling of the examinations. A total of 08 successful attempts were recorded in the National Level competitive exams such as NET, SET, GATE, etc. One research student received “Young Scientist” award in a National Level Conference and an award for paper presentation in a State Level conference. Eleven students presented research papers in conferences. One PG student of the Institute was selected for research leading to Doctoral Degree in a renowned National Institute.

6. Problems Encountered and Resources Required

- The weak academic background and fear within the students poses challenge for the mentoring process. The challenge is further enhanced in case of the economically weaker sections of the students. Personal counseling with little financial assistance at the personal level circumvents these difficulties to certain extent favoring the mentoring process.
- The weak communication abilities consequently leading to shyness within the students was another hurdle in the teaching-learning. The faculty members devoted extra time in building up the communication ability and curb the shyness. The family-like and congenial atmosphere maintained within the Institute further catalyzes the mentoring process.
- Owing to low budgetary provisions, the Institute cannot support economically weaker students for participating in out-station co- and extra-curricular activities. Separate provisions of finances would certainly boost the participation.
- Student-centric activities enlisted in the “Goals” above, if supported with additional financial assistance, can capture momentum and can be extended to needy students from other Institutions as well.
- The students need to be trained in computing skills, especially with regard to latest communication technologies such as on-line meetings, webinars, etc. The institute needs to improve infrastructural facilities for the same.

7. Notes (Optional) Nil

8. Contact Details

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Best Practice 2

1. Title of the Practice

Nurturing value-based education, social responsibilities and good citizenry

2. Goal

With an aim of carving value based education and social awareness amongst the students and faculty extension and information dissemination to the community, the Institute has launched various programs, viz. women empowerment program; special day programs; blood donation camps; awareness and conservation programs for clean and green environment inclusive water conservation and ecofriendly aspects- tree plantation, check dam construction, solid waste treatment and nutrient recycling; inculcation of value based education, socio-sensitivity, and faculty extension services like soil analysis, ground water exploration and testing, gamma irradiation, providing microbial cultures as well as popularization of science; voter awareness campaigns, etc.

3. The Context

The Institute being a Post Graduate and Research Organization caters the academic needs of the region. In addition to academics, the societal components also expect creation of sensible human resource with high human values and sensitivity towards social climate as well as science-based extension services. In order to bridge the gap between academic training and the societal expectations, the Institute has structured multi-faceted programs that cater socio-sensitivity, environmental awareness and ethical values. In addition, the Institute takes the responsibility to extend the available facilities and expertise to community welfare and nurture scientific temper amongst the community through science popularization programs.

4. The Practice

- The number of value-added courses under “Service Course” provided opportunity to the students to opt for subjects that would help in their own development. Students opted for Archaeology, Positive Psychology, Fine Arts and Environmental Science Conserving the green areas of the Institute campus to preserve and protect the large number of bird and animal species while ensuring neat, clean and green environment.
- Special sessions on soft-skills are organized under the “Placement Cell” to boost the student potential and allow them to understand the importance of effective communication in the “Job Scenario”. Additionally, participation of students in seminar presentations, poster presentations and paper presentations and various co- and extra-curricular activities also give necessary impetus for their all-round development.
- The campus waste is converted into Organic Manure through composting and vermiculture and is used for gardening and *in-campus* plantation.

- The Institute has conducted numerous community programs within and out of Aurangabad city to create awareness about Solid Waste Disposal, environment protection and health awareness.
- Research projects are undertaken with the view towards remedial treatment of toxic and hazardous industrial wastes using microbial and nanotechnology based methods.
- The Institute provides extension services to the community for routine analysis of water to ensure a healthy community and environment.
- Under the umbrella of the NSS, Institute carries out various environment related activities such as Tree Plantation within and out of the Institute campus, street plays, construction of check dam for water conservation, desilting to increase the water table, etc. The Institute has adopted several practices for energy conservation such as use of power saving devices, solar equipment, etc. The Institute organizes guest lectures and poster presentations to stress the important environmental issues and the need to conserve energy, biodiversity and the environment.
- NSS unit was encouraged to carry out unique activities for developing sensitivity towards the society, environment and the Nation and for upliftment of society through awareness programmes. Blood donation camp and dental check-up camp were organized for students and local residents. Awareness campaigns on electoral rights in residential areas adjoining Institute campus and in adopted village Georai Kuber were organized. NSS volunteers encouraged to participate in “Clean City” campaign, and mega tree plantation programme under initiatives of the State Government and an NGO. Water conservation activity, “plastic- free” campaign wall paintings with social messages advising villagers about government schemes, study of lifestyle and livelihood of village residents, biodiversity awareness activities. The Institute runs programs such as adoption of villages for tree plantation advocating avoidance of using of pesticides, using organic manure, lectures by experts for rain water harvesting, water conservation, etc.
- Students are encouraged to participate in cultural activities and sports to boost their mental and physical fitness. The International Yog Day is celebrated by inviting Yog Trainers to organize special practical workshops on Yog for stress-free life.
- Enrichment of managerial qualities amongst women was the main aim in hosting a week-long workshop on Women Empowerment under the aegis of UGC.
- In order to pay tributes to National personalities and inculcate the feeling of National Pride and social responsibility, special day programs are organized.
- The Institute extends some facilities and scientific expertise to community. These facilities include soil analysis, ground water exploration and testing, gamma irradiation and supply of microbial cultures to college teachers, researchers and industry.
- The Institute being scientific avenue, dissemination of scientific information to the masses is practiced through mass communication media (radio talks), newspaper articles and organizing National Science Day programs, Open Day and contribution of faculties as resource persons.
- The Institute actively participates in launching Voter Awareness Campaign at the time of general elections.

5. Evidence of Success

- Students got necessary motivation from the value-added courses and they performed well in the examinations since the selection of subjects was as per their choice.
- Programs under “Placement Cell” yielded success in terms of both, learning effective communication as well as a good number of on- and off-campus placements.
- The overall environmental awareness and a strong ecofriendly attitude were imbibed amongst the students. Students could learn composting method and conservation practices for keeping the environment clean and green.
- The Institute received appreciation for the effective implementation of solid waste disposal methods, preservation of cultural heritage and city farming programs organized in community places such as jails, temples, co-operative housing societies, schools, etc.
- The research papers published and presented in scientific congregations have provided additional information content in terms of environmental remediation. Students were equipped with the tools and techniques to develop sustainable and eco-friendly processes and products.
- The community was benefitted through the extension services. About 1500 Kg for waste food was collected and disposed by NSS volunteers during the holy Pandharpur pilgrimage on Ashadhi Ekadashi. The awareness about health and precious lives was effectively conveyed through health awareness and blood donation camps. Blood donation camp resulted in successful collection of blood to be eventually used for benefit of those in need. A large number of residents of Georai Kuber benefitted from the dental check-up camp.
- Tree plantation, desilting, check dam construction and CCT activities have created awareness about soil and water conservation both amongst the students as well as residents of an adopted village, Georai Kuber.
- The Institute successfully conveyed the importance of avoiding pesticides, use of organic manure and rain water harvesting to the villagers under village adoption programs. The message of using cloth bags instead of plastic bags was conveyed to school children and residents of the adopted village.

- Women empowerment program, special day programs, and voters awareness campaign have conveyed the message of gender equality, support and respect for women, National pride and social rights and responsibility.
- Biodiversity field study of forest region near Georai Kuber stressed the importance of Living World, variety of flora and fauna and interdependence of living species. The NSS volunteers understood the need to conserve the biodiversity. The volunteers got an opportunity to observe the lifestyle and livelihood of village residents and farmers.
- The Institute has profoundly contributed in popularization of science through various activities and expert lectures benefitting the schools, colleges and general public.

6. Problems Encountered and Resources Required

- The students and faculty members being engaged full-time in lectures, practical, projects and mentoring for research, the major limitation to the implementation of these extra-curricular activities is time availability.
- Lack of financial aid for village adoption and other community services was another major obstacle in implementation of these programs.

7. Notes (Optional)

Nil

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