



**UNIVERSITY OF KARACHI**

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**Institute of Marine Science, University of Karachi**

**Self-Assessment Report (2014)**

**for Ph.D. Programme**

Submitted to

**Quality Enhancement Cell, University of Karachi**

**SELF ASSESSMENT TEAM**

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*\*Errors & Omissions are expected*

## INTRODUCTION

Marine Science is a branch of Earth Science that deals with all aspects related to oceans, seas, their coasts and seabed. It covers a wide range of topics including ocean currents, waves and tides; marine organisms and ecosystem dynamics; geophysical fluid dynamics; plate tectonics and geology of the sea floor including their minerals and hydrocarbon potential; and fluxes of various chemical substances and physical properties within the ocean and across its boundaries. These diverse topics relate to a multitude of disciplines like chemistry, physics, biology, geology, meteorology, and geography that oceanographers blend together to comprehend knowledge of the world oceans and processes within it. Marine science is a contemporary field of education having emerged as a hybrid of traditional fields such as physical attributes of oceans, biology, chemistry and geology.

Marine Science is aimed over preparing graduates for a variety of interesting careers and opportunities. A marine graduate/ scientist can be employed in federal, state and local government agencies to manage and monitor the use of marine resources, solve problems and conduct research. They can be employed by private industries such as seafood, fisheries, aquaculture, exploratory marine geology, satellite imagery, and ecological modeling, including environmental agencies and numerous non-government organizations.

Pakistan borders the Arabian Sea with a sizeable coastline running for approximately 990 km in the east-west direction. Nearly 320 km of this seashore falls in the province of Sindh whereas the rest of 670 km constitute the Makran coast. The Exclusive Economic Zone, that stretches 200 nautical miles seaward from the coast, provides 240,000 km<sup>2</sup> area of the Arabian Sea for exploitation of the renewable and non-renewable resources, on which coastal population of the Sindh and Balochistan provinces largely depend for their livelihood. Besides, a huge volume of raw materials, finished products and oil imported through the maritime trade as well as the exports of Pakistani products provides employment opportunities to thousands of families in both the provinces.

This is where the need of experts of various aspects of marine science arises and the Institute of Marine Science, University of Karachi aims to produce such bright experts and skilled manpower to fuel this this national need.

The Institute's mission is to impart higher education and conduct quality research, train young scientists to meet future challenges in the field of marine science and prepare them for filling various technical posts in governmental/non-governmental agencies and industries to accomplish optimal

protection of marine resources and their sustainable exploitation. This will also assist in preparation of public policies relevant to marine environment.

I highly acknowledge the contribution by Dr. Nuzhat Afsar and Mr. Muhammad Shoaib Kiani for preparing this comprehensive Self-Assessment Report for the Institute of Marine Science, University of Karachi. Input and support received from other faculty members of the institute is highly acknowledged. I would like to express my deepest gratitude to the Quality Enhancement Cell, specifically to Prof. M. Sajidin (Director Quality Enhancement Cell, University of Karachi) and his staff for the necessary support and guidance. I expect that this document will help better introduce the institute to the reader and will also greatly assist university administration in building on its positives & removing the highlighted deficiencies in the Institute of Marine Science to make it a quality Institute.

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**Dr. Rashida Qari**

Director,  
Institute of Marine Science  
University of Karachi

**CRITERION-1**

**PROGRAMME MISSION, OBJECTIVES AND OUTCOMES**

## **Criterion-1 Programme Mission, Objectives and Outcomes**

### **Institutional Mission**

#### **Vision Statement for the Institute of Marine Science:**

The vision of the Marine Science is to expand on standard marine science education; to prepare and produce graduates in the following multi-disciplinary core areas on the way to cope future challenges:

- **Physical Oceanography**, or **marine physics**, studies deal with physical attributes of the oceans including temperature-salinity structure, mixing, waves, tides and currents, light and sound transmission, etc.
- **Chemical Oceanography** or **marine chemistry** is the study of chemistry of the ocean and its chemical interaction with the atmosphere.
- **Biological Oceanography** or **marine biology** is the study of plants, animals and microbes of the ocean and their ecological interaction with the habitat. The sustainable use of living resources may be provided through three separate modules with specific electives designed for fisheries, aquaculture and conservation biology.
- **Geological Oceanography** or **marine geology** studies the structure and morphology of the ocean floor, tectonic activity and volcanism associated with plate margins, continental margins, beaches and coastal areas, sediment transport and deposition regimes, and offshore mineral and hydrocarbon deposits etc.

Institute's mission is to initiate high-quality education expertise of the faculty that will prepare graduates and future scientists to accept the challenges of leadership, positions within the seafloor mining, seafood export, fisheries promulgation, and aquaculture and associated industries to strengthen country's economy. The department shall promote and encourage the pursuit for knowledge in new areas of marine science, innovation in skills and expertise for sustainable usage of renewable and non-renewable resources from sea i.e., natural product research and patent product usage in pharmacy, biomedical sciences & biotechnology.

#### **Programme Mission (Ph.D.)**

The mission of the Ph.D. Programme is to equip the Ph.D. qualified personnel with technical, industrial and managerial capabilities required by academia, various allied fields of curiosity and industries e.g. fisheries and aquaculture, bioresearch management, conservation and exploitation etc. Other than this mission of the Ph.D. programme is to equip researchers with an understanding of the world's oceans and a positive reception of the importance of marine ecosystems in global perspective. This mission could be consummate through a combination of hands-on laboratory and field experience, supported by a broad background and advanced knowledge in the field of marine biology, chemistry, physics, and geology of ocean.

Mission of these Marine Science Programme is to equip students with an understanding of the world's oceans and a positive reception of the importance of marine ecosystems in global perspective. This mission could be consummate through a combination of hands-on laboratory and field experience, supported by a broad background in the marine sciences, including basic knowledge of the natural science disciplines of biology, chemistry, physics, geology, statistics and mathematics.

**Standard 1-1: The Programme must have documented measurable objectives that support college and Institution mission statements.**

Recently marine science has got meaningful consideration in Pakistan and BS-marine science and B. Sc marine science programs have been initiated in Balochistan and Sindh provinces respectively. Other than that Center of Excellence for Marine Biology, UOK is a well-known institute, running M. Phil and Ph. D marine biology programs over four decades. Recently Bahria University, Karachi campus has also taken initiative to start M. Phil maritime programme.

Generally we lag behind the world in the field of marine science and technology. China, U. K, U. S and other nations have raised marine science and technology sector greatly and utilizing marine resources significantly to strengthen their commerce. There is utmost need to improve marine science on each level so may we can get prestigious status among nations. Marine Science can lead to formation of a new marine science industry in the country, which can participate more effectively and could be a part marine empowering countries. Qualified Ph. D marine scientists will be able to provide expertise in their respective fields. Under the canopy of marine science we can achieve excellence in certain commercial and industrial grounds.

#### **Ph.D. Marine Science Program**

The Institute of Marine Science offers a program of study and research leading to the doctor of philosophy in marine science. The program provides students with a broad background and overview of the fields comprising marine biology and make use of the diverse interests of the marine biology faculty within the department. As is generally the case, the Ph.D. program is primarily a research degree. As such, it is intended to serve students with interests in conducting research in academia, industry, and government along with those who intend to become faculty in undergraduate teaching institutions, managers in technology-based industries and policy makers in government. Students will learn the process of identifying, defining and solving an original research problem. The program also includes a teaching practicum with classroom instruction in pedagogical techniques and technologies along with lecture experience under the guidance of a faculty mentor. The goal of the Marine Science Program is to develop an integrated understanding of the Northern Arabian Sea ecosystem. In general with better understanding of marine ecosystems and underwater geo-marine profile, associated communities of fauna and flora including fundamental biology at the molecular and genomic levels, mapping geo-marine resources and the physical and chemical environment that impacts and shapes marine ecosystems, so may we can manage the harvesting of resources from the oceans in sustainable manners.

## **Programme Objectives (Ph.D.):**

### **Program Objectives:**

- The main objective of the programme is to prepare graduates for continued advanced learning, easy integration into industry, research careers, and other related careers in the areas of coastal developmental, environmental disciplines and management that are important to national, regional and international needs.

### **Objectives:**

1. Integrated education, training and research within area of specialization through understanding of relevant research methodologies and techniques and to develop and maintain cooperative working relationships with supervisors, colleagues and peers within the institution and wider research community to expand and uphold scientific networks.
2. To gain knowledge of recent advances within research field and in related areas and to enhance ability for original, independent and critical thinking for development of theoretical concept in order to carry out an inquiry-based research.
3. To enhance skills in scientific speech and discussion, including the ability to formally present a science project and discuss scientific issues and improved scientific writing.
4. Ability to recognize and validate problems and understand the processes of funding and evaluation of research.

Initially marine science aims to train researchers in the core disciplines of Marine Science and offers a wide variety of courses in numerous sub-disciplines. Offered degree (Ph.D.) provides opportunities to researchers to achieve certain personal and professional goals of national interest.

### **Specific Objectives:**

1. On basic level, proficiency in marine chemistry, physics, geology and biology along with computer applications related to the natural sciences, and laboratory techniques to prepare young scholars for successful careers in science, technology and public service.
2. On advanced level, multidisciplinary education and training within their area of specialization.

**Table: Programme Objectives Assessment**

**Ph.D.**

<b>S. No.</b>	<b>Objectives</b>	<b>How Measured</b>	<b>When Measured</b>	<b>Improvement Identified</b>	<b>Improvement Made</b>
1.	Integrated education, training and research within area of specialization through understanding of relevant research methodologies and techniques and to develop and maintain cooperative working relationships with supervisors, colleagues and peers within the institution and wider research community to expand and uphold scientific networks.				
2	To gain knowledge of recent advances within research field and in related areas and to enhance ability for original, independent and critical thinking for development of theoretical concept in order to carry out an inquiry-based research.				
3	To enhance skills in scientific speech and discussion, including the ability to formally present a science project and discuss scientific issues and improved scientific writing.				
4	Ability to recognize and validate problems and understand the processes of funding and evaluation of research.				

\*\* Due to the initial stage of Ph.D. Programme and preparation of first self-assessment report we are unable to fill this programme objective however; it will be filled in upcoming assessments.

**Standard 1-2: The Programme must have documented outcomes for graduating students. It must be demonstrated that the outcomes support the Programme objectives and that graduating students are capable of performing these outcomes.**

**Programme Outcomes (Ph.D.)**

After successful completion of Ph. D marine science program and obtaining degree researchers will be able to:

1. Make use of scientific knowledge to measure, analyze and manage marine systems
2. Development and implementation of marine resource management systems and policies.
3. Investigate processes, pathways, and effects of geological, physical, chemical and biological driving forces and agents on marine and coastal environment.
4. Interpretation of data, models and findings provided by other professionals and technically sound communication at proficient level with other professionals.
5. Design and conduct a study to resolve any marine related problem, using appropriate research and analytical methods.
6. To work on the sustainable use of marine resources, development and conservation of marine and coastal environment.
7. Because of growing world population it is compulsory to improve ability to produce food, energy and water from oceans to keep up our basic needs.
8. Advances in marine research and technology, will improve our ability to derive food, and energy sources from the oceans.
9. To build upon our existing knowledge of oceans and their potential to meet future challenges for next generation.
- 10.** Because of the growing concerns for exploitation of marine resources in stainable manner, there is an ever-increasing need for skilled personnel who can advise on; to organize and control the development of marine resources and activities.

**Surveys Result:**

The following surveys were conducted by the Programme Team of the Institute of marine science (IMS):

- Teacher’s Evaluation Survey was carried out from Ph.D. students by the Programme Team (annexed at the end of this report).

**Standard 1-3: The results of Programme's assessment and the extent to which they are used improve the Programme must be documented.**

Following action are routinely taken in the Institute for improvement of the Programme and those suggested by survey results will be adopted soon after completion of Self-Assessment Report (SAR):

**a) Actions Taken**

- Student Advisors (2) have been appointed for better Student-Teacher Interaction.
- Newly inducted lecturers are attached with experienced teachers to improve teaching skills and to assist in laboratory work.
- Course on Aquaculture, Marine fisheries, Conservation biology, Chemical and environmental oceanography, Marine geology, Physical oceanography are included for final year students (M. Sc.) as elective subjects.

**b) Strengths and Weaknesses of the Programme**

**i) Strengths**

- Three highly qualified faculty members holding Ph.D. degree (Marine Biology) and two junior faculty members (M.Sc. Zoology). One of the lecturers is in Ph.D. thesis defense stage while the other is also in advanced stage of Ph.D. research.

**ii) Weaknesses**

- **Space Requirement:** There is only one small classroom of about 50 student capacity and a single laboratory. Both are housed in an old and shared building (about 30 years old). Recently Worthy Vice Chancellor has generously handed over two rooms; one being used as class room and another as faculty office.
- We need four (4) laboratories to properly switch to marine biology, geology, chemistry and physical oceanography and meet practical requirements.
- Rather a separate building is required for marine science to accommodate staff and students and to fulfill basic educational needs highlighted above.
- Funds are required for classrooms, offices, laboratories. Procurement of equipments is essential in order to strengthen and update the laboratories.
- Students and staff are required to be familiar with oceanographic cruises and exercises and should be actively engaged in such activities.

### c) Future Development Plans

Following surveys hopefully would be conducted on regular basis in future:

- Graduating Students Survey
- Student's Course Evaluation Survey
- Teacher's Evaluation Survey

**Standard 1-4: The department must assess its overall performance periodically.**

#### Student Enrolment – Ph.D. Programme

S. No.	Year	No. of Students (Available seats)
1	2014	10
2	2013	5
3	2012	-

### a) Student Enrolment

S. No	Year	Degree			
		B.Sc.	M.Sc.	M.Phil.	Ph.D.
1	2014	-	-	-	2
2	2013	-	-	-	-
3	2012	-	-	-	-

**b) Student/Faculty Ratio:** 1:1 approx. (present)

**c) i) Time for B.Sc. /M.Sc. In Department:** Minimum Four Years

**ii) Time for M.Phil.:** Minimum two years

**iii) Time for Ph.D.:** Minimum three years

**d) The average student grade point (CGPA):** 3.0 CGPA

### e) Employer's Satisfaction

Highly qualified Ph. D graduates of the Institute of Marine Science would be equipped with high quality research and interpersonal skills and techniques (relevant to field of specialization) demanded by the industries and other employers for employment. IMS students would be able to serve and to provide expertise in various government and non-government organizations like Universities, colleges, industries etc.

Other than that they could play role in maritime and other strategic policy making as whole or proactive team member, can work with NGOs like WWF-Pakistan & IUCN and other R&D institutes like National Institute of Oceanography (NIO) and Marine Fisheries Department (MFD).

The Institute endeavors to conduct Employer's Opinion Survey in future regularly and also will conduct seminars with employers to align the research student skills with employer's demands.

**f) Student/Faculty Satisfaction**

The facilities and capacity of Institute of Marine Science is gradually but consistently upgraded and both faculty and students are satisfied with its progress. However, there is considerable room for improvement in the areas highlighted in this report for making it a high standard institute.

**g) Research Activities**

Regardless of minimum existing facilities, research activities at the institute of marine science are a constant feature. Staff and students are involved in active research activities. Currently two research projects are running under supervision of Ph.D. faculty members funded by Higher Education Commission (HEC) and Dean Faculty Science (DFS), University of Karachi. At present 3 projects have been submitted for funding from HEC. Field surveys are consistently carried out at the Institute of Marine Science for collection of samples and for promoting hands on experience in young researchers. New sources of funding need to be explored and more financial assistance from Karachi University & HEC is required (this is also greatly emphasized by current research students during surveys annexed at the end of this report).

**CRITERION-2**

**CURRICULUM DESIGN AND ORGANIZATION**

**Criterion-2 Curriculum Design and Organization**

**Programme of Studies offered**

**Ph.D. Degree Programme – structure and Semester Wise Courses**

**Scheme of Study Ph.D. in Marine Science**

Semester/Year	Name of Subject	Credit Hours
<b>First Year: First Semester</b>		
MS-801	Research Seminars	4+0
MS-802	Seminar on Current Advances in the Discipline	4+0
MS-803	Thesis and Manuscript Writing Skills	6+0
MS-804	Development of Research Proposal for Funding Agencies	4+0
<b>Structured courses</b>	Minimum requirement of 18 credit hours is already fulfilled by preparation of non-structured courses given above. However, the faculty is working on preparation of structured Ph.D. courses to offer more choice to the research students.	

**Standard 2-1: The Curriculum must be consistent and support the Programme’s documented objectives**

**Programme of Studies offered : Ph.D. Programme**

Courses	Programme’s Objectives				
	1	2	3	4	5
<b>Major Courses</b>	MS-801: Research Seminars	MS-802: Seminar on Current Advances in Marine Science	MS-803: Thesis and Manuscript Writing Skills	MS-804: Development of Research Grant Proposal	-
<b>Structured Courses</b>	<i>Under preparation</i>				
<b>Practical (Field and Lab.)</b>					
<b>Thesis/Dissertation</b>	Yes				
Course numbers indicate fulfilment of Programme objectives.					

**Standard 2-2: Theoretical background, problem analysis and solution design must be stressed within the Programme’s core material.**

The following table indicates the elements covered in core courses:

<b>Elements</b>	<b>Courses</b>
i) Theoretical Background	Introduction to marine science, Marine ecology and ecosystems, Marine resources, Physical oceanography, Marine geology
ii) Problem Analysis	Coastal zone management, Marine pollution and control, Functional biology of marine organisms, Geology of the Arabian Sera
iii) Solution Design	Application of remote sensing and GIS, Marine environmental impact assessment, Fisheries resources management, Seafood handling, processing and safety, Ocean Modeling

**Standard 2-3: The curriculum must satisfy the core requirements for the Programme, as specified by the respective accreditation body.**

**&**

**Standard 2-4: The curriculum must satisfy the major requirements for the Programme, as specified by the respective accreditation body/council.**

The curriculum adopted by Institute of Marine Science has been approved by the Higher Education Commission (HEC) and developed by NCRC (Nation Curriculum Revision Committee-HEC), (Last Revised: 2011) approved by competent authority and statutory bodies of University of Karachi. The institute also actively participated in National Curriculum Development &Revision.

**Standard 2-5: The curriculum must satisfy the general education, arts and other discipline requirements for the Programme as specified by the accreditation body.**

-NA- for Ph.D. Programme.

**Standard 2-6: Information technology component of the curriculum must be integrated throughout the Programme.**

-NA- for Ph.D. programme.

**Standard 2-7: Oral and written communication skills of the student must be developed and applied in the Programme.**

Courses; Research Seminars (801), Seminar on Current Advances in the Discipline (802), Thesis and Manuscript Writing Skills (803) and Development of Research Proposal for Funding Agencies (804) have been included in Ph.D. programme which can cover above mentioned aspects effectively.

**CRITERION-3**

**LABORATORY AND COMPUTING FACILITIES**

### **CITERION-3: Laboratory and Computing Facilities**

#### **Laboratory Facilities**

Listed laboratories are required to carry and conduct certain experiments in the field of biological, chemical, geological and physical oceanography as per students Ph. D research design and requirements to meet future challenges.

- 1. Biological oceanography Laboratory**
- 2. Chemical oceanography Laboratory**
- 3. Physical oceanography Laboratory**
- 4. Geological oceanography Laboratory**
- 5. Computer Laboratory**

Computer with networking is also required because at present there is no general computer lab. at IMS.

#### **Computer Facilities**

The Institute has no computer lab. for teachers, graduate and research students. We need computer lab. with internet facility to meet the institutional requirements. Currently we need at least 10-12 computers to fulfill our requirements. A large number of international research journals are available on HEJ's Digital Library provided by the Higher Education Commission (HEC) and research article of interest can be downloaded from this library. Students can get access to this wonderful facility by getting them registered and having an ID card.

#### **Standard 3-1: Laboratory manuals/ documentation instruction for experiments must be available and readily accessible to faculty and students**

No facility is available for teachers and students of such kind because we don't have any well-equipped & organized laboratory in the Institute of Marine Science at present. Currently, a grant of approx. 3,50,000/- Rs. is available for development of labs. which is insufficient and needs to be increased considerably. However, the existing funds also need to be utilized efficiently.

#### **Standard 3-2: There must be adequate support personnel for instruction and maintaining the laboratories.**

There is no supporting laboratory and field staff is available at IMS. Therefore, there is an urgent need to appoint at least four laboratory assistants and two field attendants on priority basis to help and support staff and students to fulfill basic field and laboratory needs.

**Standard 3-3: The University computing infrastructure and facilities must be adequate to support programme's objectives**

**i) Computing Facilities**

The Institute doesn't have adequate networking and computer facilities.

**ii) Multimedia**

Currently institute has only one multimedia while we are running 3 programmes at a time.

**iii) Website**

The university's website [www.uok.edu.pk](http://www.uok.edu.pk) has a link for institute of marine science.

**iv) Internet**

The department has limited Internet facility for staff, interconnected with main communication network of the university but hasn't provided with PC's by the university due to non-availability of funds.

**CRITERION-4**

**STUDENT SUPPORT AND ADVISING**

#### **Criterion-4 Student Support and Advising**

The Institute of Marine Science has ample student advising and support systems for helping them effectively understand the main concepts behind the programme of their choice, requirements, its efficient completion and career opportunities. The director of the institute, the student advisors and the entire faculty play a dynamic role in this regard by interacting with students on all critical stages during their programme and also informally interacting with them on various occasions.

**Standard 4-1: Courses must have been offered with sufficient frequency and number for students to complete the programme in a timely manner.**

#### **Departmental Strategy for Course Offering**

The Institute of Marine Science imparts higher education (Ph.D. Programme) as per following weekly schedule:

<b>Programme</b>	<b>Classes per Week</b>	<b>Practical Classes per Week</b>
Ph.D.	Three lectures per week for 3+0 or 3+1 course.  Two lectures per week for 2+0 or 2+1 course.	Practical sessions of three hours per week for courses which include practical.

**Standard 4-2: Course in the major must be structured to ensure effective interaction between students, faculty and teaching assistants.**

Course allocation is decided in the faculty meeting. There is also provision for extra tutorial classes for greater interaction between students and teachers and particularly in unavoidable circumstances such as strikes in the city etc.

**Standard 4-3: Guidance on how to complete the Programme must be available to all students and access to academic advising must be available to make course decisions and career choices**

- The Director of the Institute nominates a faculty member as ‘Students Advisor’ who is available to all students for course decision and career choices. The Student Advisor and the Director help the students by providing information regarding career opportunities.
- The Director displays on the Notice Board the opportunities of job, membership in technical and professional societies and related information regularly.

**CRITERION-5**

**PROCESS CONTROL**

## **Criterion-5: Process Control**

**Standard 5-1: The process by which students are admitted to the Programme must be based on quantitative and qualitative criteria and clearly documented. This process must be periodically evaluated to ensure that it is meeting its objectives.**

### **Admission Policy:**

- Minimum 60% marks in Intermediate
- Merit based
- All M.Phil./Ph.D. students applicants are required to appear in Admission Entry Test, based on following break-up:
  - English (20 %)
  - Biology (20 %)
  - Chemistry (15 %)
  - Geology (10 %)
  - Maths (10 %)
  - Physics (10 %)
  - General Knowledge (15 %)
- Applicants merit list is compiled on the following weightage:  
50% Academic Marks (M.Sc. in relevant fields as per advertisement) and 50% Entry Test Marks

**Standard 5-2: The process by which students are registered in the Programme and monitoring of students progress to ensure timely completion of the Programme must be documented. This process must be periodically evaluated to ensure that it is meeting its objectives.**

Courses are completed timely and monitoring procedures e.g. tests, assignments, seminars for students are documented regularly. Regular teaching staff meetings are held. Additional classes are adjusted, immediately for any unscheduled closure.

**Standard 5-3: The process of recruiting and retaining highly qualified faculty members must be in place and clearly documented. Also processes and procedures for faculty evaluation, promotion must be consistent with institutional mission statement. These processes must be periodically evaluated to ensure that it is meeting with its objectives.**

HEC rules with approval by the University Syndicate are applied for appointment.

Teachers are encouraged to improve their qualifications.

## **Appointments/ Promotion Procedure**

### **Basic Pay Scale (BPS)**

Appointments are based on HEC rules given below.

**a. Lecturer (BPS- 18):**

**Minimum Qualification**

M.Sc. Degree (first Class) in the relevant field with no 3<sup>rd</sup> division in the Academic Career from HEC recognized University/Institution. During the next two years (i.e. until June 30<sup>th</sup>, 2008) if no candidate is available without 3<sup>rd</sup> division in the academic record, then the University may forward the case for appointment of a selected candidate to the HEC for consideration and approval.

No experience required.

**b. Assistant Professor (BPS- 19):**

**Minimum Qualification**

Ph.D. in the relevant field from HEC recognized University/Institution, No experience required.

**OR**

Master's Degree (foreign) or M.Phil. or equivalent degree in the relevant field after 18 years of education as determined by the HEC in the subject from HEC recognized University/Institutions, with 4 years teaching/research experience in a recognized university or a post-graduate Institution or in National or International Organization.

**c. Associate Professor (BPS- 20)**

**Minimum Qualification**

Ph.D. in relevant field from HEC recognized University / Institution.

**Experience**

10-years teaching/research in HEC recognized University or a Post-graduate Institution or Professional Experience in the relevant field in a National or International Organization.

**OR**

5-years post Ph.D. teaching/research experience in HEC recognized University or a post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**Minimum Number of Publications**

10 research publications (with at least 2 publications in last 5 years) in internationally abstract Journals recognized by the HEC.

**d. Professor (BPS-21)**

**Minimum Qualification**

Ph.D. from HEC recognized Institution in relevant field.

**Experience**

15-years teaching / research experience in HEC recognized University or post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**OR**

10-years post-Ph.D. teaching/research experience in a recognized University or a post post-graduate Institution or professional experience in the relevant field in a National or International Organization.

**Minimum Number of Publications**

15 research publications in internationally abstracted Journals recognized by the HEC.

**Basis for Appointments / Promotions (under tenure track system)**

Four main areas where a candidate is evaluated for Tenure Track Scheme;

- Teaching
- Research
- Service
- Personal Characteristics

**General Criteria for Appointment on TTS**

All faculty members in any discipline are eligible to apply for appointment provided they fulfill the following minimum eligibility conditions;

**a. Assistant Professor**

**Minimum Qualification**

PhD from a recognized University with excellent communication/presentation skills.

**b. Associate Professor**

**Minimum Qualification**

PhD with 6 years post - PhD teaching / research experience in a recognized University.

**Minimum Number of Publications**

10 research articles published in journals having impact factor.

**c. Professor:**

**Minimum Qualification**

PhD with 11 years post-PhD teaching / research experience from a recognized University.

**Minimum Number of Publications:**

15 research articles published in journals having impact factor.

**Faculty Evaluation Process**

University rules are adopted.

**Standard 5-4: The process and procedure used to ensure that teaching and delivery of course material to the students emphasizes active learning and that course learning outcomes are met. The process must be periodically evaluated to ensure that it is meeting its objectives.**

To ensure teaching and delivery of course material and promotion of active learning the following are observed strictly:

- a. Time table is followed by all faculty members.
- b. Course outlines and details of recommended books for each course are shared with students at the start of each semester.
- c. Although Power Point presentations are delivered but it is always encouraged to consult books and take notes of all important material.
- d. Director of the Institute regularly gets feedback from the students during the semester.

**Standard 5-5: The process that ensures that graduates have completed the requirements of the Programme must be based on standards, effective and clearly documented procedures. This process must be periodically evaluated to ensure that it is meeting its objectives.**

- a) All the students failing to meet 75% attendance requirement are dropped from final examination.
- b) Promotion to the next year is granted only if 80% or more courses are cleared.
- c) Assignments, presentations, seminars, subject tests, projects and field trips are an integral part of evaluation of student performance based on which he/she is assessed.

**CRITERION-6**

**FACULTY**

## **Criterion-6 Faculty**

Most of the faculty members of the Institute of Marine Science have been recruited and inducted in 2013 and is a good combination of experienced and young teachers. This provides the Institute with a nice balance required for carrying out quality teaching and research in the field of marine science. All the faculty members observe punctuality and try to keep abreast with latest knowledge in their respective fields of research

**Standard 6-1: There must be enough full time faculty who are committed to the programme to provide adequate coverage of the programme areas / courses with continuity and stability. The interest of all faculty members must be sufficient to teach all courses, plan, modify and update courses. The majority must hold a Ph.D. degree in the discipline.**

The institute has 5 full time faculty members including one Associate Professor, one Assistant Professor (temporary) and one regular Assistant Professor and two Lecturers. Three senior faculty members are holding Ph.D. degree while one Lecturer is in the Ph.D. thesis defense stage and hoping to be awarded with degree in near future. One remaining Lecturer is also in advanced stage of Ph.D. research. All the faculty members are highly committed to the Programme and work in the office hours and beyond for the purpose of imparting quality education and carrying out excellent basic/applicable research. The faculty members regularly participate in various exercises aimed at development, modification and up gradation of courses. This improves them as professionals and increases their capacity to perform as independent teachers and researchers.

**Standard 6-2: All faculty members must remain current in the discipline and sufficient time must be provided for scholarly activities and professional development. Also, effective programmes for faculty development must be in place.**

Since our entire faculty members are active researchers in their fields of interests therefore, they are always engaged in activities that increase their capacity as a teacher and researcher:

- i) Participate in seminars, delivering invited lecturers, regular literature survey and reading, writing publications in national and international (peer reviewed journals) and attending international conferences, seminars, workshops and symposia for interaction with contemporary researchers from advanced countries.
- ii) All teachers have been appointed under HEC criteria in their respective cadre.
- iii) Teachers are always available in the Institute and are engaged in various skill development activities such as teaching, reading, publication writing, performing research work, going to field (in sea) for collection of samples and advising students on various matters.
- iv) The teachers also write and submit proposals to various funding agencies for carrying out active research and for development of their labs.
- v) All the faculty members are interested to avail the opportunities that come their way for their professional development e.g. postdoc studies etc.

**Standard 6-3: All faculty members should be motivated and have job satisfaction to excel in their profession**

The Institute of Marine Science inculcates internal motivation and job satisfaction by following simple strategies:

- i) The institute follows HEC criteria for recruitment of new faculty members which makes the process fair and merit based. Promotions also follow similar rigorous criteria and new posts are advertised in popular national newspapers and on Karachi University website to make them equal opportunity posts.
- ii) A competitive and pleasant academic environment has been created in the Institute by involvement of all faculty members in the departmental affairs, by appreciation of their hard work and performance based evaluation. All the incentives under Karachi University rules are available for all the various cadres.

**CRITERION-7**

**INSTITUTIONAL FACILITIES**

## **Criterion-7 Institutional Facilities**

The institute of marine has limited infrastructure but it is doing its best to make efficient use of available facilities and build on them consistently. The Institute has one proper class room, two temporary class rooms (one in auditorium and one in general laboratory), an auditorium, a general laboratory, and three rooms for five faculty members. Since, the start of B.Sc. (Hons.) Programme in 2013 the institute has improved considerably by induction of 04 new faculty members (2 Assistant Professors & two Lecturers, upgrading its class room(s) & auditorium, equipping general laboratory with new chemicals and equipment, holding regular seminars and invited lectures on various topics relevant to marine science.

In light of a very ambitious and progressive mission statement of the Institute of Marine Science it is the need of the time to equip this very important and nationally significant marine science institute with better infrastructure and facilities in form of new rooms for faculty, class rooms, laboratories, administration staff, and by filling various posts necessary for smooth functioning of the institute e.g. Librarian (1), Lab. Assistants (4), Field Assistants (2), Vehicle Drivers (2), Store Keeper (1) etc. The Institute has no vehicle at present which should be addressed immediately because the faculty and students frequently need a sturdy field vehicle to visit coastal areas for research purpose.

**Standard 7-1: The Institution must have the infrastructure to support new trends in learning such as E-learning.**

### **a) Departmental library and Internet Facility**

Departmental library has few hundred books but most are of minimum help to students for preparation of course material. Recommended recent books for all the courses need to be added in the department library. Subscription to few relevant journals needs to be achieved for assistance of faculty members and research students.

The Institute has sufficient internet facility however; this needs to be strengthened by establishment of a good quality computer laboratory for general use by students to accomplish their learning requirements e.g. preparation of assignments and presentations. This will enhance the quality of infrastructure for E-learning in the Institute of Marine Science which is minimum at this time.

### **b) Main Library**

Faculty members and students of the institute are allowed to use the main Library which has extended working hours. The main library provides the following services;

- i. Course related books
- ii. Digital library having access to journals and E-books

**Standard 7-2: The library must possess an up-to-date technical collection relevant to the Programme and must be adequately staffed with professional personnel.**

No proper library exists in the Institute of Marine Science although there is a collection of various books relevant to marine science but most are outdated and books recommended in the syllabi outline are not available. New books are not purchased and there is no qualified librarian in the Institute.

It is absolutely vital that a proper seminar library be established in the Institute as soon as possible, a post of librarian should be filled immediately and mechanism should be developed to fulfill at least minimum requirement of recommended books and faculty should be involved in the process of purchase of recommended books.

**Standard 7-3: Class rooms must be adequately equipped and offices must be adequate to enable faculty to carry out their responsibility.**

### **Classrooms**

There is only one proper class room in the Institute of Marine Science though it is imparting education of various levels i.e. B.Sc. (Hons.), M.Sc. (first batch due in 2015) and M.Phil./Ph.D. This is compensated by taking classes in general laboratory and in the auditorium where both teachers and students don't feel comfortable due to various reasons. Only one multimedia is available in the institute due to which teachers have to adjust their classes and make arrangements before-hand for using this modern teaching facility. This is a major hurdle in completion of various syllabus courses in stipulated time.

Separate offices for faculty members are urgently needed and those already existing need up gradation such as paint, repair of windows and doors, properly functioning taps and sinks for washing etc. Notice boards should be installed in each of the faculty rooms for display of academic material, publications and general information.

### **Faculty Offices**

The faculty of Institute of Marine Science does not have separate offices at present. They sit together in two congested rooms which affect their efficiency and teaching and research activities. Office computers are still to be provided to the faculty members who bring their own lap top computers to overcome this problem. The administrative staff also sits in the Director's office and having no separate office. In this situation the Institute is in urgent need of separate offices for faculty and administrative staff.

**CRITERION-8**

**INSTITUTIONAL SUPPORT**

## Criterion-8 Institutional Support

Though various forms of institutional support exist at the Institute of Marine Science (highlighted below under various headings) but there is a great need to add new support system and strengthen what already exists. The Programme are achieving objectives but this can improve many folds by inclusion of new and more recent forms of institutional support e.g. vehicle for field surveys, recruitment of lab. and field assistants, librarian, store keeper and a computer expert. Preferably, the Institute should have a small well equipped Resource Centre that can help students on various matters related to research such as computer skills, statistics & data analysis and other expert advice on thesis writing etc. Funding is the major limitation in this connection which should be addressed on priority.

**Standard 8-1: There must be sufficient support and financial resources to attract and retain high quality faculty and provide the means for them to maintain competence as teacher and scholars.**

For this purpose, the incentives permissible under rules of University of Karachi are available for various cadres however, there is a need to revise them and possibly make them more attractive to sustain high interest and motivation in well qualified faculty members. Implementation of performance based TTS package is one way of dealing with it but this should be done with consultation of entire faculty of the Institute. Other areas that need serious improvements include separate offices, computers and other associated facilities, medical, housing, department vehicle with driver for field activities (absent at present) and extracurricular facilities.

**Standard 8-2: There must be an adequate number of high quality graduate students, research assistants and Ph.D. Students**

The details of M.Phil./Ph.D. students enrolled at the Institute of Marine Science in last three years given as under:

S. No.	Year	No. of Students
1	2014	20
2	2013	15
3	2012	10

Student/Faculty Ratio (for the last three years): 2011-2012 (10:1) and Current is (5:1).

**Standard 8-3: Financial resources must be provided to acquire and maintain library holding, laboratories and computing facilities.**

Currently, the Institute of Marine Science has no proper library and generalized computer laboratory. Although the institute has in its collection various books relating to marine science but most of them are outdated and there is no proper place to archive them. The Institute has no qualified librarian at present. Presently the funding available for library is only 1,000,00/- Rs. Adequate funds and provision of space for housing the library facility is urgently needed.

## **FACULTY CVs**

### Faculty Members in the Institute of Marine Science, University of Karachi

Name of Faculty Member	Designation	Joining Year	Details of Qualifications			Specialization	Experience
			Qualification	Year	Institution		Total (years)
<b>Dr. Rashida Qari</b>	Associate Professor	2008	PhD	2003	Centre of Excellence in Marine Biology, University of Karachi	Marine Pollution	<b>Teaching</b> >25 years <b>Research</b> >20 years
<b>Dr. Ehsan Elahi Valeem</b>	Assistant Professor (Temporary)	2013	Ph.D.	2005	Centre of Excellence in Marine Biology, University of Karachi	Marine Phycology & Phyco-chemistry	<b>Teaching</b> >20 years (college) and 1 year six month (university) <b>Research</b> 15 years
<b>Dr. Nuzhat Afsar</b>	Assistant Professor	2013	Ph.D.	2009	Centre of Excellence in Marine Biology, University of Karachi	Marine Environment	<b>Teaching</b> 4 years & six months <b>Research</b> 9 years
<b>Mr. Muhammad Shoaib Kiani</b>	Lecturer	2013	M.Sc.	2004	University of the Punjab, Lahore	Marine mammals and other large marine vertebrates/ General Marine Conservation	<b>Teaching</b> (1 year & 6 months) <b>Research</b> 9 years
<b>Ms. Nazia Arshad</b>	Lecturer	2013	M.Sc.	2009	University of Karachi	Marine Biology/ Benthic Ecology	<b>Teaching</b> (1 year & 6 months) <b>Research</b> 2 years

## **SURVEY RESULTS**

# **Syllabus**

**Ph.D. in Marine Science**