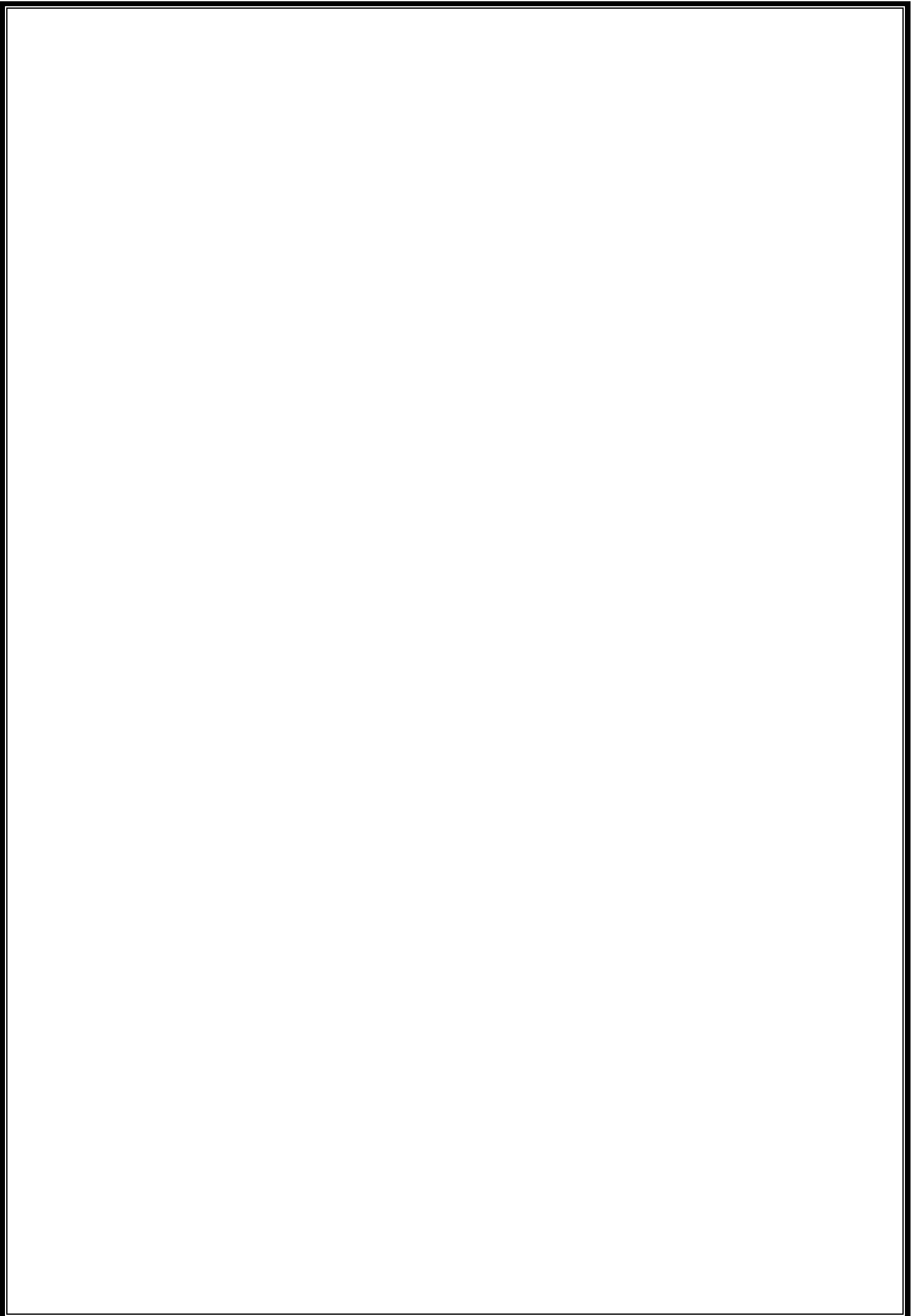Ministry of Health and Family Welfare
Allied Health Section 2015-16

सत्यमेव जयते

Model Curriculum Handbook

HEALTH INFORMATION MANAGEMENT

Model Curriculum Handbook

HEALTH INFORMATION MANAGEMENT

सत्यमेव जयते

Ministry of Health and Family Welfare

Allied Health Section

Contents

Contributors to drafting and review

HEALTH INFORMATION MANAGEMENT TASKFORCE

1. Dr K. Vivekanand, SVIMS, Tirupati
2. Dr S. Mahalakshmi, Apollo Institute of Hospital Management & Allied Sciences, Chennai
3. Dr Mridu Dudeja, Jamia Hamdard
4. Dr V. C. Aggarwal, Vardaman Mahavir Medical College & Safdarjung Hospital
5. Prof. Suptendra Nath Sarbadhikari, Centre for Health Informatics, National Health Portal
6. Dr Roopalekha Jathanna, Manipal College of Allied Health Sciences, Manipal University
7. Dr Param Hans Mishra, Indian Spinal Injuries Centre
8. Dr Sabu K. M., Manipal College of Allied Health Sciences, Manipal University
9. Dr Anita Rustagi, JIPMER, Puducherry

NATIONAL CURRICULA REVIEW COMMITTEE

1. Mr. Ali R. Rizvi, Joint Secretary (in-charge Human Resource), Ministry of Health & Family Welfare (MoHFW)- Chairman
2. Prof. Sanjay Srivastava, DDG(ME), MoHFW
3. Mr. B. S Murthy, Director (AHS), MoHFW
4. Dr. Arun Kr. Agarwal, Ex-Dean, MAMC
5. Dr. B.V. Adkoli, Educationalist, Ex-AIIMS
6. Dr. Bipin Batra, Executive Director, NBE
7. Dr. Subhash Salunke, Senior Advisor, PHFI
8. Dr. T K Jena, Professor, School of Health Sciences, IGNOU
9. Dr. Zenab Zaidi, Director, Health Sector Skill Council
10. Ms. Kavita Narayan, Director- NIAHS TSU

Content organizer and moderator – Ms. Natasha D'Lima, Ms Tanu Sri Sahu

Project Director – Ms. Kavita Narayan

List of Abbreviations

ACLS	Advanced Cardiac Life Support
AHPs	Allied and Healthcare Professionals
B. Sc.	Bachelor of Science
BLS	Basic life support
BMW	Bio Medical Waste
CATS	Credit Accumulation and Transfer System
CBCS	Choice-Based Credit System
CBD	Case-based discussion
CEX	Mini Case Evaluation Exercise
CHC	Community Health Centre
CPR	Cardio Pulmonary Resuscitation
CPU	Central Processing Unit
DH	District Hospital
ECG	Electrocardiogram
ECTS	European Credit Transfer System
EEG	Electroencephalogram
EMG	Electromyogram
EMR	Electronic Medical Records
HoD	Head of Department
HSSC	Healthcare Sector Skill Council
ILO	International Labour Organization
ISO	International Organization for Standardization
JCI	Joint Commission International
JD	Job description
LAN	Local Area Network
M.B.B.S.	Bachelor of Medicine and Bachelor of Surgery
M. Sc.	Master of Science
MAN	Metropolitan area network
MLC	Medico legal case
MoHFW	Ministry of Health and Family Welfare
MoU	Memorandum of Understanding
MS	Microsoft
NAAC	National Assessment and Accreditation Council
NABH	National Accreditation Board for Hospitals & Healthcare Providers
NBAHS	National Board of Allied Health Sciences
NCRC	National Curricula Review Committee
NHM	National Health Mission
NHP	National Health Programme
NIAHS TSU	National Initiative for Allied Health Sciences-Technical Support Unit
NSDA	National Skills Development Agency

NSQF	National Skills Qualification Framework
OSCE	Objective Structured Clinical Examination
OSLER	Objective Structured Long Examination Record
OSPE	Objective Structured Practical Examination
PCM/B	Physics, Chemistry, Maths/ Biology
PG	Post Graduate
Ph.D.	Doctor of Philosophy
PHC	Primary Health Centre
PPE	Personal Protective Equipment
RAM	Random Access Memory
ROM	Read-Only Memory
SDH	Sub District Hospital
SDL	self-directed learning
UGC	University Grants Commission
UHC	Universal Health Care
WAN	Wide area network
WBC	White Blood Cells
WWW	World Wide Web

Chapter 1
Introduction to the Handbook

Chapter 1: Introduction to the Handbook

The report 'From Paramedics to Allied Health Professionals: Landscaping the Journey and Way Forward' that was published in 2012, marked the variance in education and training practices for the allied and healthcare courses offered by institutions across the country. This prompted the Ministry of Health and Family Welfare to envisage the creation of national guidelines for education and career pathways of allied and healthcare professionals, with a structured curriculum based on skills and competencies. Thus, this handbook has been designed to familiarize universities, colleges, healthcare providers as well as educators offering allied and healthcare courses with these national standards.

Individually, created for different professional groups of allied and healthcare, this handbook aims to reduce the variation in education by comprising of a standardized curriculum, career pathways, nomenclature and other details for each profession. The change from a purely didactic approach will create better skilled professionals and improve the quality of overall patient care. In the absence of a national standard-setting authority, this handbook can also guide the thousands of young adults who choose healthcare as a profession – not as doctors or nurses but to play several other critical roles – on the appropriate course of action to enable them to be skilled allied and healthcare professionals of the future.

Who is an Allied and Healthcare Professional?

The Ministry of Health and Family Welfare, accepted in its entirety the definition of an allied and healthcare professional based on the afore-mentioned report, though the same has evolved after multiple consultations and the recommended definition is now as follows-

'Allied and healthcare professionals (AHPs) includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.'

Since the past few years, many professional groups have been interacting and seeking guidance on all those who would qualify under the purview of "allied and healthcare professionals". In the healthcare system, statutory bodies exist for clinicians, nurses, pharmacists and dental practitioners; but a regulatory structure for around 50 professions is absent in India. Currently, the Government is considering these professions (as listed Annex-1) under the ambit of the allied and healthcare system. However, this number is subject to changes and modifications over time, particularly considering how quickly new technologies and new clinical avenues are expanding globally, creating newer cadres of such professionals.

Scope and need for allied and healthcare professionals in the Indian healthcare system

The quality of medical care has improved tremendously in the last few decades due to the advances in technology, thus creating fresh challenges in the field of healthcare. It is now widely recognized that health service delivery is a team effort involving both clinicians and non-clinicians, and is not the sole duty of physicians and nurses.[1] Professionals that can competently handle sophisticated

machinery and advanced protocols are now in high demand. In fact, diagnosis is now so dependent on technology, that allied and healthcare professionals (AHPs) are vital to successful treatment delivery.

Effective delivery of healthcare services depends largely on the nature of education, training and appropriate orientation towards community health of all categories of health personnel, and their capacity to function as an integrated team. For instance in the UK, more than 84,000 AHPs, with a range of skills and expertise, play key roles within the National Health Service, working autonomously, in multi-professional teams in various settings. All of them are first-contact practitioners and work across a wide range of locations and sectors within acute, primary and community care. Australia's health system is managed not just by their doctors and nurses, but also by the 90,000 university-trained, autonomous AHPs vital to the system.[2,3]

As the Indian government aims for Universal Health Coverage, the lack of skilled human resource may prove to be the biggest impediment in its path to achieve targeted goals. The benefits of having AHPs in the healthcare system are still unexplored in India. Although an enormous amount of evidence suggests that the benefits of AHPs range from improving access to healthcare services to significant reduction in the cost of care, though the Indian healthcare system still revolves around the doctor-centric approach. The privatization of healthcare has also led to an ever-increasing out-of-pocket expenditure by the population. However, many examples assert the need of skilled allied and healthcare professionals in the system, such as in the case of stroke survivors, it is the support of AHPs that significantly enhance their rehabilitation and long term treatment ensures return to normal life. AHPs also play a significant role to care for patients who struggle mentally and emotionally in the current challenging environment and require mental health support; and help them return to well-being.[2] Children with communication difficulties, the elderly, cancer patients, patients with long term conditions such as diabetes people with vision problems and amputees; the list of people and potential patients who benefit from AHPs is indefinite.

Thus, the breadth and scope of the allied and healthcare practice varies from one end to another, including areas of work listed below:

- Across the age span of human development from neonate to old age;
- With patients having complex and challenging problems resulting from systemic illnesses such as in the case of diabetes, cardiac abnormalities/conditions and elderly care to name a few;
- Towards health promotion and disease prevention, as well as assessment, management and evaluation of interventions and protocols for treatment;
- In a broad range of settings from a patient's home to community, primary care centers, to tertiary care settings; and
- With an understanding of the healthcare issues associated with diverse socio-economies and cultural norms within the society.

Learning goals and objectives for allied and healthcare professionals

The handbook has been designed with a focus on performance-based outcomes pertaining to different levels. The learning goals and objectives of the undergraduate and graduate education program will be based on the performance expectations. They will be articulated as learning goals

(why we teach this) and learning objectives (what the students will learn). Using the framework, students will learn to integrate their knowledge, skills and abilities in a hands-on manner in a professional healthcare setting. These learning goals are divided into nine key areas, though the degree of required involvement may differ across various levels of qualification and professional cadres:

1. Clinical care
2. Communication
3. Membership of a multidisciplinary health team
4. Ethics and accountability at all levels (clinical, professional, personal and social)
5. Commitment to professional excellence
6. Leadership and mentorship
7. Social accountability and responsibility
8. Scientific attitude and scholarship (only at higher level- PhD)
9. Lifelong learning

1. Clinical Care[4]

Using a patient/family-centered approach and best evidence, each student will organize and implement the prescribed preventive, investigative and management plans; and will offer appropriate follow-up services. Program objectives should enable the students to:

- Apply the principles of basic science and evidence-based practice
- Use relevant investigations as needed
- Identify the indications for basic procedures and perform them in an appropriate manner
- Provide care to patients – efficiently and in a cost-effective way – in a range of settings, and maintain foremost the interests of individual patients
- Identify the influence of biological, psychosocial, economic, and spiritual factors on patients' well-being and act in an appropriate manner
- Incorporate strategies for health promotion and disease prevention with their patients

2. Communication[4,5]

The student will learn how to communicate with patients/clients, care-givers, other health professionals and other members of the community effectively and appropriately. Communication is a fundamental requirement in the provision of health care services. Program objectives should enable the students to:

- Provide sufficient information to ensure that the patient/client can participate as actively as possible and respond appropriately to the information
- Clearly discuss the diagnosis and options with the patient, and negotiate appropriate treatment plans in a sensitive manner that is in the patient's and society's best interests
- Explain the proposed healthcare service – its nature, purpose, possible positive and adverse consequences, its limitations, and reasonable alternatives wherever they exist
- Use effective communication skills to gather data and share information including attentive listening, open-ended inquiry, empathy and clarification to ensure understanding

- Appropriately communicate with, and provide relevant information to, other stakeholders including members of the healthcare team
- Use communication effectively and flexibly in a manner that is appropriate for the reader or listener
- Explore and consider the influence that the patient's ideas, beliefs and expectations have during interactions with them, along with varying factors such as age, ethnicity, culture and socioeconomic background
- Develop efficient techniques for all forms of written and verbal communication including accurate and timely record keeping
- Assess their own communication skills, develop self-awareness and be able to improve their relationships with others
- Possess skills to counsel for lifestyle changes and advocate health promotion

3. Membership of a multidisciplinary health team[6]

The student will put a high value on effective communication within the team, including transparency about aims, decisions, uncertainty and mistakes. Team-based health care is the provision of health services to individuals, families, and/or their communities by at least two health providers who work collaboratively to accomplish shared goals within and across settings to achieve coordinated, high quality care. Program objectives will aim at making the students being able to:

- Recognize, clearly articulate, understand and support shared goals in the team that reflect patient and family priorities
- Possess distinct roles within the team; to have clear expectations for each member's functions, responsibilities, and accountabilities, which in turn optimizes the team's efficiency and makes it possible for them to use division of labor advantageously, and accomplish more than the sum of its parts
- Develop mutual trust within the team to create strong norms of reciprocity and greater opportunities for shared achievement
- Communicate effectively so that the team prioritizes and continuously refines its communication channels creating an environment of general and specific understanding
- Recognize measurable processes and outcomes, so that the individual and team can agree on and implement reliable and timely feedback on successes and failures in both the team's functioning and the achievement of their goals. These can then be used to track and improve performance immediately and over time.

4. Ethics and accountability

Students will understand core concepts of clinical ethics and law so that they may apply these to their practice as healthcare service providers. Program objectives should enable the students to:

- Describe and apply the basic concepts of clinical ethics to actual cases and situations
- Recognize the need to make health care resources available to patients fairly, equitably and without bias, discrimination or undue influence
- Demonstrate an understanding and application of basic legal concepts to the practice

- Employ professional accountability for the initiation, maintenance and termination of patient-provider relationships
- Demonstrate respect for each patient's individual rights of autonomy, privacy, and confidentiality

5. Commitment to professional excellence[7]

The student will execute professionalism to reflect in his/her thought and action a range of attributes and characteristics that include technical competence, appearance, image, confidence level, empathy, compassion, understanding, patience, manners, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude, and appropriate physical contact to ensure safe, effective and expected delivery of healthcare. Program objectives will aim at making the students being able to:

- Demonstrate distinctive, meritorious and high quality practice that leads to excellence and that depicts commitment to competence, standards, ethical principles and values, within the legal boundaries of practice
- Demonstrate the quality of being answerable for all actions and omissions to all, including service users, peers, employers, standard-setting/regulatory bodies or oneself
- Demonstrate humanity in the course of everyday practice by virtue of having respect (and dignity), compassion, empathy, honour and integrity
- Ensure that self-interest does not influence actions or omissions, and demonstrate regards for service-users and colleagues

6. Leadership and mentorship[8]

The student must take on a leadership role where needed in order to ensure clinical productivity and patient satisfaction. They must be able to respond in an autonomous and confident manner to planned and uncertain situations, and should be able to manage themselves and others effectively. They must create and maximize opportunities for the improvement of the health seeking experience and delivery of healthcare services. Program objectives should enable the students to:

- Act as agents of change and be leaders in quality improvement and service development, so that they contribute and enhance people's wellbeing and their healthcare experience
- Systematically evaluate care; ensure the use of these findings to help improve people's experience and care outcomes, and to shape clinical treatment protocols and services
- Identify priorities and effectively manage time and resources to ensure the maintenance or enhancement of the quality of care
- Recognize and be self-aware of the effect their own values, principles and assumptions may have on their practice. They must take charge of their own personal and professional development and should learn from experience (through supervision, feedback, reflection and evaluation)
- Facilitate themselves and others in the development of their competence, by using a range of professional and personal development skills
- Work independently and in teams. They must be able to take a leadership role to coordinate, delegate and supervise care safely, manage risk and remain accountable for

the care given; actively involve and respect others' contributions to integrated person-centered care; yet work in an effective manner across professional and agency boundaries. They must know when and how to communicate with patients and refer them to other professionals and agencies, to respect the choices of service users and others, to promote shared decision-making, to deliver positive outcomes, and to coordinate smooth and effective transition within and between services and agencies.

7. Social Accountability and Responsibility[9]

The students will recognize that allied and healthcare professionals need to be advocates within the health care system, to judiciously manage resources and to acknowledge their social accountability.[10] They have a mandate to serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns. Program objectives should enable the students to:

- Demonstrate knowledge of the determinants of health at local, regional and national levels and respond to the population needs
- Establish and promote innovative practice patterns by providing evidence-based care and testing new models of practice that will translate the results of research into practice, and thus meet individual and community needs in a more effective manner
- Develop a shared vision of an evolving and sustainable health care system for the future by working in collaboration with and reinforcing partnerships with other stakeholders, including academic health centres, governments, communities and other relevant professional and non-professional organizations
- Advocate for the services and resources needed for optimal patient care

8. Scientific attitude and Scholarship[10]

The student will utilize sound scientific and/or scholarly principles during interactions with patients and peers, educational endeavors, research activities and in all other aspects of their professional lives. Program objectives should enable the students to:

- Engage in ongoing self-assessment and structure their continuing professional education to address the specific needs of the population
- Practice evidence-based by applying principles of scientific methods
- Take responsibility for their educational experiences
- Acquire basic skills such as presentation skills, giving feedback, patient education and the design and dissemination of research knowledge; for their application to teaching encounters

9. Lifelong learning[11]

The student should be committed to continuous improvement in skills and knowledge while harnessing modern tools and technology. Program objectives will aim at making the students being able to:

- Perform objective self-assessments of their knowledge and skills; learn and refine existing skills; and acquire new skills

- Apply newly gained knowledge or skills to patient care
- Enhance their personal and professional growth and learning by constant introspection and utilizing experiences
- Search (including through electronic means), and critically evaluate medical literature to enable its application to patient care
- Develop a research question and be familiar with basic, clinical and translational research in its application to patient care
- Identify and select an appropriate, professionally rewarding and personally fulfilling career pathway

Introduction of new elements in allied and healthcare education

Competency-based curriculum

A significant skill gap has been observed in the professionals offering healthcare services irrespective of the hierarchy and level of responsibility in the healthcare settings. The large variation in the quality of services is due to the diverse methodologies opted for healthcare education and the difference in expectations from a graduate after completion of a course and at work. What one is expected 'to perform' at work is assumed to be learned during the course, however, the course design focuses on what one is expected 'to know'. The competency-based curriculum thus connects the dots between the 'know what' and 'do how'.

The efficiency and effectiveness of any educational programme largely depends on the curriculum design that is being followed. With emerging medical and scientific knowledge, educators have realized that learning is no more limited to memorizing specific lists of facts and data; in fact, by the time the professional aims to practice in the healthcare setting, the acquired knowledge may stand outdated. Thus, competency-based education is the answer; a curricular concept designed to provide the skills that professionals need. A competency-based program is a mix of skills and competencies based on individual or population needs (such as clinical knowledge, patient care, or communications approaches), which is then developed to teach relevant content across a range of courses and settings. While the traditional system of education focuses on objectives, content, teacher-centric approach and summative evaluation; competency-based education has a focus on competencies, outcomes, performance and accomplishments. In such a case, teaching activities are learner-centered, and evaluation is continuous and formative in structure. The competency-based credentials depend on the demonstration of a defined set of competencies which enables a professional to achieve targeted goals. Competency frameworks comprise of a clearly articulated statement of a person's abilities on the completion of the credential, which allows students, employers, and other stakeholders to set their expectations appropriately.[12] [13]

Considering the need of the present and future healthcare delivery system, the curriculum design depicted in this handbook thus will be based on skills and competencies.

Promoting self-directed learning of the professionals

The shift in the focus from traditional to competency-based education has made it pertinent that the learning processes may also be revisited for suitable changes. It is a known fact that learning is no more restricted to the boundaries of a classroom or the lessons taught by a teacher. The new tools and technologies have widened the platform and introduced innovative modes of how students can learn and gain skills and knowledge. One of the innovative approaches is learner-centric and follows the concept of **self-directed learning.**

Self-directed learning, in its broadest meaning, describes a process in which individuals take the initiative with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying resources for learning, choosing and implementing learning strategies and evaluating learning outcomes (Knowles, 1975).[14]

In self-directed learning, learners themselves take the initiative to use resources rather than simply reacting to transmissions from resources, which helps them learn more in a better way.[15] Lifelong, self-directed learning (SDL) has been identified as an important ability for medical graduates (Harvey, 2003)[16] and so is applicable to other health professionals including AHPs. It has been

proven through many studies worldwide that the self-directed method is better than the teacher-centric method of learning. Teacher-directed learning makes learners more dependent and the orientation to learning becomes subject-centered. If a teacher provides the learning material, the student is usually satisfied with the available material, whereas if a student is asked to work on the same assignment, he or she invariably has to explore extensive resources on the subject.[15]

Thus the handbook promotes self-directed learning, apart from the usual classroom teaching and opens the platform for students who wish to engage in lifelong learning.

Credit hours vs traditional system

Recently the National Assessment and Accreditation Council (NAAC) and the University Grants Commission (UGC) have highlighted the need for the development of a Choice-Based Credit System (CBCS), at par with global standards and the adoption of an effective grading system to measure a learner's performance.[17] All the major higher education providers across the globe are operating a system of credits. The European Credit Transfer System (ECTS), the 'National Qualifications Framework' in Australia, the Pan-Canadian Protocol on the Transferability of University Credits, the Credit Accumulation and Transfer System (CATS) in the UK as well as the systems operating in the US, Japan, etc. are examples of these. Globally, a need now exists for the use of a fully convertible credit-based system that can be accepted at other universities. It has now become imperative to offer flexible curricular choices and provide learners mobility due to the popularity of initiatives such as 'twinning programmes', 'joint degrees' and 'study abroad' programmes.[18]

In order to ensure global acceptability of the graduates, the current curriculum structure is divided into smaller sections with focus on hours of studying which can be converted into credit hours as per the international norms followed by various other countries.

Integrated structure of the curriculum

Vertical integration, in its truest sense, is the interweaving of teaching clinical skills and knowledge into the basic science years and, reinforcing and continuing to teach the applications of basic science concepts during the clinical years. (Many efforts called 'vertical integration' include only the first half of the process).

Horizontal integration is the identification of concepts or skills, especially those that are clinically relevant, that cut across (for example, the basic sciences), and then putting these to use as an integrated focus for presentations, clinical examples, and course materials. e.g. Integration of some of the basic science courses around organ systems, e.g., human anatomy, physiology, pathology; or incorporating ethics, legal issues, finance, political issues, humanities, culture and computer skills into different aspects of a course like the Clinical Continuum.

The aim of an integrated curriculum is to lead students to a level of scientific fluency that is beyond mere fact and concept acquisition, by the use of a common language of medical science, with which they can begin to think creatively about medical problems.[19]

This innovative new curriculum has been structured in a way such that it facilitates horizontal and vertical integration between disciplines; and bridges the gaps between both theory & practice, and between hospital-based practice and community practice. The amount of time devoted to basic and laboratory sciences (integrated with their clinical relevance) would be the maximum in the first year,

progressively decreasing in the second and third year of the training, making clinical exposure and learning more dominant.[11] However it may differ from course to course depending on the professional group.

Introduction of foundation course in the curriculum

The foundation course for allied and healthcare professions is an immersive programme designed to impart the required knowledge, skills and confidence for seamless transition to the second semester of a professional allied and healthcare course. Post admission, the foundation course is designed for a period of 6 months to prepare a student to study the respective allied and healthcare course effectively and to understand the basics of healthcare system. This aims to orient the student to national health systems and the basics of public health, medical ethics, medical terminologies, communication skills, basic life support, computer learning, infection prevention and control, environmental issues and disaster management, as well as orientation to the community with focus on issues such as gender sensitivity, disability, human rights, civil rights etc. Though the flexibility to the course designers have been provided in terms of – modifying the required numbers of hours for each foundation subject and appropriate placement of the subject across various semesters.

Learning methodologies

With a focus on self-directed learning, the curriculum will include a foundation course that focuses on communication, basic clinical skills and professionalism; and will incorporate clinical training from the first year itself. It is recommended that the primary care level should have sufficient clinical exposure integrated with the learning of basic and laboratory sciences. There should also be an emphasis on the introduction of case scenarios for classroom discussion/case-based learning.

Healthcare education and training is the backbone of an efficient healthcare system and India's education infrastructure is yet to gain from the ongoing international technological revolution. The report '*From Paramedics to Allied Health: Landscaping the Journey and way ahead'*, indicates that teaching and learning of clinical skills occur at the patient's bedside or other clinical areas such as laboratories, augmented by didactic teaching in classrooms and lecture theatres. In addition to keeping up with the pace of technological advancement, there has been a paradigm shift to outcome-based education with the adoption of effective assessment patterns. However, the demand for demonstration of competence in institutions where it is currently limited needs to be promoted. The report also mentions some of the allied and healthcare schools in India that have instituted clinical skill centres, laboratories and high-fidelity simulation laboratories to enhance the practice and training for allied and healthcare students and professionals. The report reiterates the fact that simulation is the replication of part or all of a clinical encounter through the use of mannequins, computer-assisted resources and simulated patients. The use of simulators addresses many issues such as suboptimal use of resources and equipment, by adequately training the manpower on newer technologies, limitations for imparting practical training in real-life scenarios, and ineffective skills assessment methods among others.[1] The table mentioned below lists various modes of teaching and learning opportunities that harness advanced tools and technologies.

Table 1 Clinical learning opportunities imparted through the use of advanced techniques[1,20]

Teaching modality	Learning opportunity examples
Patients	Teach and assess in selected clinical scenarios

	Practice soft skills
	Practice physical examination
	Receive feedback on performance
Mannequins	Perform acquired techniques
	Practice basic procedural skills
	Apply basic science understanding to clinical problem solving
Simulators	Practice teamwork and leadership
	Perform cardiac and pulmonary care skills
	Apply basic science understanding to clinical problem solving
Task under trainers	Monitor and terminate dialysis treatment, etc.

Assessment methods

Traditional assessment of students consists of the yearly system of assessments. In most institutions, assessments consist of internal and external assessments, and a theory examination at the end of the year or semester. This basically assesses knowledge instead of assessing skills or competencies. In competency-based training, the evaluation of the students is based on the performance of the skills as per their competencies. Hence, all the three attributes – knowledge, skills, and attitudes – are assessed as required for the particular competency.

Several new methods and tools are now readily accessible, the use of which requires special training. Some of these are given below:

- Objective Structured Clinical Examination(OSCE), Objective Structured Practical Examination (OSPE), Objective Structured Long Examination Record(OSLER)
- Mini Case Evaluation Exercise(CEX)
- Case-based discussion(CBD)
- Direct observation of procedures(DOPs)
- Portfolio
- Multi-source feedback
- Patient satisfaction questionnaire

An objective structured clinical examination (OSCE) is used these days in a number of allied and healthcare courses, e.g. Optometry, Physiotherapy, and Radiography. It tests the performance and competence in communication, clinical examination, and medical procedures/prescriptions. In physiotherapy, orthotics, and occupational therapy, it tests exercise prescription, joint mobilization/manipulation techniques; and in radiography it tests radiographic positioning, radiographic image evaluation, and interpretation of results. The basic essential elements consist of functional analysis of the occupational roles, translation of these roles ("competencies") into outcomes, and assessment of trainees' progress in these outcomes on the basis of demonstrated performance. Progress is defined solely by the competencies achieved and not the underlying processes or time served in formal educational settings. Most methods use predetermined, agreed assessment criteria (such as observation check-lists or rating scales for scoring) to emphasize on

frequent assessment of learning outcomes. Hence, it is imperative for teachers to be aware of these developments and they should suitably adopt them in the allied and healthcare education system.[21]

Chapter 2

Methodology of Curriculum Development

Chapter 2: Methodology of curriculum development

With the release of the report 'From Paramedics to Allied Health: Landscaping the journey and the way ahead', the Ministry of Health and Family Welfare prioritized the key recommendations and concerns raised by various allied and healthcare professionals groups and experts as indicated in the report. One of the major recommendations in the report was the need for standardization of curriculum and pedagogic requirements for the major allied and healthcare professional courses.

The MoHFW has identified 12 priority professional streams in the phase-I for the purpose of standardization. The expertise of over 50 leading public and private allied and healthcare educational institutions for 12 different disciplines has been sought as part of this exercise. Additionally, international experts from Canada, Sweden, USA and UK are also being roped in, to arrive at a comprehensive and globally acceptable set of educational standards based on a skills and competencies approach. The opinions were sought from experts for all the courses, though curricula for the following two professions were not redesigned as they fall under the ambit of regulatory body- Rehabilitation Council of India governed by Ministry of Social Justice and Empowerment –

- Audiology and Speech Pathology
- Orthotics and Prosthetics

The National Skills Development Agency has also developed the National Skills Qualification Framework (NSQF). Under the aegis of the NSDA, the Healthcare Sector Skill Council (HSSC) has undertaken a similar process for a few entry level allied and healthcare courses (Certificate and Diploma level). The focus of Ministry of Health and Family Welfare is thus to pre-empt duplication of efforts and arrive at a comprehensive set of minimum standards for the allied and healthcare professions but for higher level professional qualifications. This would ensure that the key considerations and obligations of both the public and the private sector are adequately addressed.

In view of the above, the Ministry of Health and Family Welfare instituted 12 National Curricula Redesign Taskforce groups comprising of academicians and professionals from the best institutes and colleges across the country. These people served as subject experts and redesigned the curricula based on a standardized framework developed by the NIAHS TSU (National Initiative for Allied Health Sciences-Technical Support Unit), which is the technical arm supporting this project. The final curriculum has been reviewed and approved by the National Curricula Review Committee (NCRC), (constituted by the MoHFW), that consists of experts with versatile and immense experience in their respective streams, to assess the applicability of the curricula drafted in view of the healthcare system as a whole.

Steps undertaken in the curricula review process –

1. Curricula were sought from various States and institutions across the country in response to which the NIAHS TSU reviewed–
   a. 118 curricula of allied and healthcare courses (different levels and different professions) from 10 states across the country;
   b. 133 curricula of various allied and healthcare courses collected during phase-I of the NIAHS project.

2. Literature review –a comprehensive literature review was undertaken resulting in a detailed curriculum of the allied and healthcare courses, which included competency and skills-based models followed nationally as well as internationally, methodologies of curriculum development, assessment protocols, and many such aspects of curriculum development. The literature review helped the TSU to develop a reference document that comprised of a standard framework for a competency-based curriculum to be followed for the curricula review and redesign. A detailed mapping of all the resources was undertaken and shared with the taskgroup experts via email.

3. Constitution of the National Curricula Redesign Taskforces for various professional groups – Specific taskforces were then instituted comprising of technical as well as subject experts who were engaged in the process of redesigning the curriculum.

4. Constitution of the National Curricula Review Committee (NCRC) – The NCRC comprising of experts with versatile and immense experiences of their respective domain, was then constituted for final review and approval on the curriculum drafted by the taskforce and NIAHS TSU.

5. National Curricula Redesign Taskforce Consultations– a series of consultations were conducted with subject experts including both regional and national taskgroup experts to develop a 'skill and competency' framework for education and career pathways. The consultations were facilitated by the NIAHS TSU members and were led by the chairperson of the group. Post this, the draft version and recommendations were compiled by the TSU members and sent to the experts for final review and consent.

6. Local consultations – These were also conducted in different hospitals and other healthcare settings to get suggestions, feedbacks and ideas from the subject experts for their respective curricula.

7. Response draft – Comments and suggestions were received on the draft and a response draft curriculum was prepared, which was then re-circulated for final consent and validation by the taskgroup experts.

8. Submission and approval of draft curriculum – The final draft of the curriculum handbook was then submitted by the taskforce chairman to the National Curricula Review Committee for approval and final sign-off.

9. Public opinion – The handbook was uploaded to seek public opinion from national and international experts, students, faculty, and practitioners of the respective professional groups.

10. Final approval by the NCRC- The comments and suggestions by the public were then reviewed and considered for any possible modification by the taskforce group. The final approval and sign off for the overall structure was then sought from NCRC.

11. Dissemination- The final handbook (guidelines) is disseminated by the Ministry of Health and Family Welfare for further adoption and incorporation by institutes/universities as applicable to ensure standardization.

Chapter 3
Background of the profession

Chapter 3: Background of the profession

Statement of Philosophy– Why this profession holds so much importance?

A Health Information Management (HIM) Professional is one of the key positions in a healthcare organization responsible for management of various health related information of patient generated within the healthcare system. HIM involves maintaining, collecting, analysing protecting and disseminating traditional and digital medical information essential for delivery of quality care. The World Health Organization stated that the proper collection, management and use of information within the healthcare systems will determine the system's effectiveness in detecting health problems, defining priorities, identifying innovative solutions and allocating resources to improve health outcomes.

About Health Information Management

Health Information Management covers a broad spectrum of information pertaining to health of the people generated within or outside a healthcare system. Every day, tens of thousands of people across the country visits various healthcare facilities, and these facilities generate huge volume of information pertaining to people health. The majority of healthcare data of a person is captured in a medical record digitally or manually maintained and this includes a wide range of information such as socio-demographic details, family history, past and present illness, physical findings, investigation reports, diagnosis, treatment, medication, etc. Proper management of such vital health information is crucial for patient and physician for continuity of care as well as beneficial for different purposes: health insurance, statistics, research, healthcare administration, policy formulation, public health management, medico-legal cases etc.

Scope of practice

A Health Information Management professional responsibility cover the collection, storage, analysis and dissemination of healthcare information within the healthcare system. HIM personnel's in a healthcare setting would ensure the accuracy and timeliness of patient data for the continuity of quality care. The HIM professionals are essential for all healthcare setting to generate reports and records about patient care, design and manage health information systems, maintain security and legal aspects of patient records and establishing appropriate procedures to protect patient data. A well trained and skilled HIM professionals would be able to take up various challenging positions in public and private hospitals, public health services, health insurance sector, healthcare IT & research organizations and education institutions.

Recognition of Title and qualification

Within the healthcare team, the person responsible for collecting and managing a patient's information for efficient care is the HIM professional, also earlier referred to as a medical record keeper. However, HIM is the internationally accepted nomenclature for the profession.

The recommended title thus stands as the Health Information Management (HIM) professional for this group.

It is a known fact that with the career advancement the nomenclature will also vary and will also depend on the sector and profile of the professional. Thus the taskforce has provided the following nomenclature table to map the career pathways and progression in different sectors of professional

practice for HIM professionals. The table also indicates the corresponding level of qualification with experience required by the professional to fulfil the requirements of each level.

Table 2: Nomenclature based on career progression for Health Information Management

Levels	Nomenclature in various sectors			Qualification and experience
	Professional	Academic	Management /sales in industry	
Level 4	Health Information Management Assistant (Diploma)	NA	NA	Diploma (2 years course), no work experience
Level 5	Senior Health Information Management Assistant (Diploma)	NA	NA	Diploma in Health Information Management and 2-3 years' work experience
Level 6	Health Information Management Technologist (Degree)	Tutor (Degree)	NA	B.Sc. Health Information Management, no work experience
Level 7	Health Information Management Officer (Degree)	Lecturer (Graduate)	Assistant Manager (Degree)	B.Sc. Health Information Management and 2 - 3 years' work experience
Level 8	Asst. Manager (Degree and above)	Assistant Professor	Deputy Manager (Degree)	B.Sc. Health Information Management and 6-8 years' work experience/ M.Sc. Health Information Management (For academic position, M.Sc. Health Information Management)
Level 9	Deputy Manager (Degree and above)	Associate Professor	Manager (Degree)	B.Sc. Health Information Management and 10 years' work experience/ M.Sc. Health Information Management and 2 - 3 years' work experience (For academic position, M.Sc. Health Information Management with PhD with minimum of 5 years teaching experience)
Level 10	Manager (Degree and above)/ Health Information Compliance officer	Professor	Clinical Technical Head (Degree)	B.Sc. Health Information Management and 15 - 18 years' experience/ M.Sc. Health Information Management and 6-8 years' work experience. (For academic position, M.Sc. Health Information Management with PhD with minimum of 10 years teaching experience)

Definition of Health Information Management Professional

A Health Information Management technologist is the person that compiles, processes, and maintains the medical records of hospital and clinic patients in a manner consistent with medical, administrative, ethical, legal, and regulatory requirements of the health care system. He/she processes, maintains, compiles, and reports patient information for health requirements and standards in a manner consistent with the healthcare industry's numerical coding system.[22]

Education

When developing any educational programme, it is necessary that it should be planned such that it is outcome-based, and it meets not just the local and national manpower requirements, but also provides personal satisfaction and career potential for professionals with supporting pathways for their development. One of the major changes is the paradigm shift of the focus from traditional theoretical knowledge to one on skills- and competency-based education and training. Optimal education/training requires that the student is able to integrate knowledge, skills and attitude in order to be able to perform a professional act adequately in a given situation.

Thus the following curriculum has been designed accordingly in a prescriptive fashion, with an aim to standardize the content across the nation.

The student would follow the path of a diploma, a bachelors' and a masters' degree to practice in this field.

Entry requirements

It is recommended that the students entering this programme should have completed the recognized secondary school studies as the qualification stipulated for the Health Information Management course (diploma/degree), i.e. **10+2 or equivalent examination with PCB/PCMB** from a recognized university or board which would provide the foundation for and prepare them for higher education studies.

Course duration

It is recommended that any programme developed from this curriculum should have a minimum of the following duration to qualify as an entry level course in Health Information Management -
- **2 year (4 semester) programme with an additional 6 months of clinical training/ internship – Diploma level (2.5 Years)**
- **3 year (6 semester) B. Sc. programme with an additional year of clinical training/ internship – Bachelor's degree level (4 years)**
- **2 year (4 semester) M. Sc. programme inclusive of 6 months of clinical training/ internship – Masters' degree level (2 years)**

Initially, the academic content should emphasize on establishing a strong scientific basis and in the latter year, it should focus on the application of theory to clinical/reflective practice.

Teaching faculty and infrastructure

The importance of providing an adequate learning environment for the students cannot be over emphasized. Both the physical infrastructure and the teaching staff must be adequate.
Teaching areas should facilitate different teaching methods. While students may share didactic lectures with other disciplines in large lecture theatres, smaller teaching areas should also be provided for tutorial and problem/case-based learning approaches. In all venues that accommodate students, health and safety standards must be adhered to. It is recommended that a faculty and student ratio of 1:10 be followed.

Job availability

As per the ILO documentation, employers worldwide are not looking for job applicants who can only apply technical skills in the workplace, but for those who can also communicate effectively, including with customers; can work in teams, with good interpersonal skills; can solve problems; have good ICT skills; are willing and able to learn; and are flexible in their approach to work.[23]

Graduates can expect to be employed in hospitals as Health Information Management Technologists and Officers.

Chapter 4

Model Curriculum of Health Information Management courses

Chapter 4: Model Curriculum

Background

Information is the life blood of health care delivery system. The medical record, in manual or automated form, houses the medical information that describes all aspects of patient care. Physicians, nurses, and other health care providers require medical information for treating a patient. The medical record serves as a communication link among care-givers. Documentation in the medical record also serves to protect the legal interests of the patient, health care provider, and health care facility.

The aim of the recommended curriculum is to produce HIM professionals who understand the**:**

- Definition and characteristics of 'Good' Medical Record
- Values of 'Good' Medical Record to various users
- Required Characteristics of entries in medical Records
- Responsibility for Medical Record Quality

They should be able to manage:
- Source-oriented, Problem-oriented, and Integrated Health Information Management
- Medical Record Forms and their Content
- Standard Order of Arrangement of Medical Record forms
- Analysis of Medical Record-Quantitative & Qualitative and Incomplete Record Control

All aspects of Health Information Management have been considered in the development of this curriculum together with the identification of the roles expected for different levels of HIM professionals based on their qualification and experience. The need for connecting the dots between the education and employment practices has been the road map for devising this curriculum.

The National Curriculum Taskforce on Health Information Management has successfully designed the career and qualification map indicating the growth opportunities for a professional in the career pathway based on the level as indicated in the National Skills Qualification Framework (NSQF). The career pathway indicates **level 4 as the entry level** after the completion of a minimum 2.5 years of diploma level programme, with internship (Diploma in Health Information Management) as well as **level 5 as the entry level** after completion of a minimum 3.5 years of Baccalaureate level programme, with internship (B. Sc. in Health Information Management). The components of the programmes starting from diploma and above has been detailed in the coming chapters.

A foundation course has also been designed to bring all the students at the same level of understanding with respect to basic healthcare related norms before the start of a career in a healthcare professional course. The foundation course is mandatory for all the allied health professional courses and for both entry level courses – diploma as well as degree. If a diploma holder has completed the foundation course and is willing to pursue the degree course, the candidate will directly get entry for next semester, however a pre- qualifier skill test will have to be satisfactorily completed, if not, then the candidate will have to undergo the first semester of foundation course again.

4.1 Diploma in Health Information Management

Diploma in Health Information Management

Introduction:

Objectives/aim of the course:

To develop competent Health Information Management professionals that can:

- Enable the health care organization to better manage patient information
- Support health care administrators in routine activities
- Apply the knowledge obtained on specialized areas effectively in the health care system
- Work collaboratively with other health care professionals to achieve a quality service

Eligibility for admission:

Selection procedure

1. He/she has passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board with pass marks in Physics, Chemistry, Biology/Mathematics.
2. He/she has attained the age of 17 years as on - (current year) & maximum age limit is 30 years.
3. He/she has to furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner and two references from persons other than relatives testifying to satisfactory general character.

Duration of the course

Duration of the course is of 2.5 years or 5 semesters (inclusive of six months of internship) with 1465 hours of Theory & 655 hours of Practical Classes and 720 hours dedicated for internship.

Total number of hours – 2840.

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance:

A candidate will be permitted to appear for the University Examination for any semester if he / she secure not less than 80% of attendance (separately in theoretical and Practical) during the calendar year, failing which he / she should complete the number of days/hours and undergo the next semester/final examination conducted by the university.

A candidate has to secure minimum 80% in Skills training (practical) for qualifying to appear for the final examination. No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

Assessment:

The scheme of examination is as follows:

First Year

S. No.	Subject title	IA		University Exam		Oral	
		Max	Min	Max	Min	Max	Min
1.	Health Information Management – I	50	25	100	50	50	25
2.	Anatomy, Physiology & Lab Science	50	25	100	50	-	-
3.	General Statistics & Biostatistics	50	25	100	50	-	-
4.	Medical Terminology	50	25	100	50	50	25

Internal Paper

S. No	Subject Title	IA		Theory	
1.	Communication Skills in English	Max	Min	Max	Min
		50	25	100	25

* English is internal paper. Marks to be sent to the university. There will be no university examination for English paper.

Internal Assessment-
Theory (20)
Practical (20)
Log Book/Project/Record (10)

Wherever there is no Log Book/Project/Record work the 10 mark be added to the Practical of the respective subject.

Second Year

S. No	Subject Title	IA		University Exam		Oral	
		Max	Min	Max	Min	Max	Min
1.	International Classification of Diseases(ICD-10) and Surgical Procedures (ICD-9CM)	50	25	100	50	50	25
2.	Health Information Management – II	50	25	100	50	50	25
3.	Hospital Organization & Administration	50	25	100	50	-	-

Internal Paper:

S. No	Subject Title	IA		Theory	
1	Computer Skills	Max	Min	Max	Min
		50	25	100	25

* Computer skills is internal paper. Marks to be sent to the university. There will be no university examination for Computer skills paper.

FIRST YEAR

Sub code	Subjects	Duration of exams	Session marks	University marks
DHIM 1-1	Health Information Management – I	3 hours	50	100
DHIM 1-2	Anatomy, Physiology, & lab science	3 hours	50	100
DHIM 1-3	General statistics & Biostatistics	3 hours	50	100
DHIM 1-4	Communication skills	3 hours	50	100
DHIM 1-5	Medical Terminology I	3 hours	50	100
Oral	Oral in DHIM 1&5 paper	15 mts	50	50

SECOND YEAR

S. No	Subjects	Duration of exam	Session Marks	University Marks
1.	International Classification of Diseases(ICD-10) and Surgical Procedures (ICD-9CM)	3 hours	50	100
2.	Health Information Management – II	3 hours	50	100
3.	Computer Skills	3 hours	50	100
4.	Hospital Organization & Administration	3 hours	50	100
5.	Oral in DHIM 1&2 paper	15 minutes	50	50

Model Curriculum Outline

First Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DHIM-001	Introduction to Healthcare Delivery System in India	60	0	60
DHIM-002	Basic computers and information Science	10	40	50
DHIM-003	Communication and soft skills	20	10	30
DHIM-004	Medical Terminology and Record keeping (including anatomical terms)	40	0	40
DHIM-005	Medical Law and Ethics	40	0	40
DHIM-006	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	40	60	100
DHIM-007	Professionalism and values	20	0	20
DHIM-008	Research Methodology and Biostatistics	40	20	60
DHIM-009	Principals of Management	40	0	40
DHIM-010	Community orientation and clinical visit (including related practical to course 001)*	0	100	100
	TOTAL	310	230	540

Teaching resources (tutors) should be made available at every institute for basic subjects such as – Biology and English for students who wish to undertake the extra classes for the same.

Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DHIM-011	Health Information Management – I	80	20	100
DHIM-012	Anatomy, Physiology, & lab science	80	-	120
DHIM-013	General statistics & Biostatistics	50	25	75
DHIM-014	Communication skills	120	30	150
DHIM-015	Medical Terminology – II	75	20	95
	TOTAL	405	95	500

Third Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DHIM-016	International Classification of Diseases (ICD-10) and Surgical Procedures (ICD-9CM) and SNOMED-CT	170	110	280
DHIM-017	Health Information Management – II	100	70	170
DHIM-018	Special Lectures	90	-	90
	TOTAL	360	180	540

Fourth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
DHIM-019	Computer Skills	150	80	230
DHIM-020	Hospital Organization & Administration	150	70	220
DHIM-021	Special Lectures	90	-	90
TOTAL		390	150	540

Fifth Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
	Internship		720	720

First Semester

Foundation course

Introduction to National Healthcare System

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
   a. Healthcare delivery system in India at primary, secondary and tertiary care
   b. Community participation in healthcare delivery system
   c. Health system in developed countries.
   d. Private Sector
   e. National Health Mission
   f. National Health Policy
   g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.
3. Introduction to AYUSH system of medicine
   a. Introduction to Ayurveda.
   b. Yoga and Naturopathy
   c. Unani
   d. Siddha
   e. Homeopathy
   f. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics-
   a. Demography – its concept
   b. Vital events of life & its impact on demography

       c. Significance and recording of vital statistics

       d. Census & its impact on health policy

  6. Epidemiology

       a. Principles of Epidemiology

       b. Natural History of disease

       c. Methods of Epidemiological studies

       d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Medical terminologies and record keeping

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.[24]Topics to be covered under the subject are as follows:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports (Practical training to be included).
9. Data entry and management on electronic health record system.

Basic computers and information science

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.

5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).

6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.

7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.

8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.

9. Introduction of Operating System: introduction, operating system concepts, types of operating system.

10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

12. Application of Computers in clinical settings.

Practical on fundamentals of computers -

1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
2. To install different software.
3. Data entry efficiency
4. Miscellaneous: Scanning of documents (of various sizes) and in different conditions (for e.g., mutilated), file naming, saving, uploading, etc. Copying of original medical document, back up of old data/ records.

Medical law and ethics

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.[25]

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".[25] Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct

3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of Health Information Management – Medico legal case and type-Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

Communication and soft skills

Major topics to be covered under Communication course[26] –

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.
4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

Introduction to Quality and patient safety

1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.
    a. Concepts of Quality of Care
    b. Quality Improvement Approaches
    c. Standards and Norms
    d. Quality Improvement Tools
    e. Introduction to NABH guidelines

2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:

a. Vital signs and primary assessment
b. Basic emergency care – first aid and triage
c. Ventilations including use of bag-valve-masks (BVMs)
d. Choking, rescue breathing methods
e. One- and Two-rescuer CPR
f. Using an AED (Automated external defibrillator).
g. Managing an emergency including moving a patient

At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
   a. Definition of Biomedical Waste
   b. Waste minimization
   c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
   d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
   e. BMW Management & methods of disinfection
   f. Modern technology for handling BMW
   g. Use of Personal protective equipment (PPE)
   h. Monitoring & controlling of cross infection (Protective devices)

4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
   a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
   b. Prevention & control of common healthcare associated infections,
   c. Components of an effective infection control program, and
   d. Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance-
   a. History of Antibiotics
   b. How Resistance Happens and Spreads
   c. Types of resistance- Intrinsic, Acquired, Passive
   d. Trends in Drug Resistance
   e. Actions to Fight Resistance
   f. Bacterial persistence
   g. Antibiotic sensitivity
   h. Consequences of antibiotic resistance

i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-
    a. Fundamentals of emergency management,
    b. Psychological impact management,
    c. Resource management,
    d. Preparedness and risk reduction,
    e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Professionalism and Values

The course on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

1. Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
2. Personal values- ethical or moral values
3. Attitude and behavior- professional behavior, treating people equally
4. Code of conduct , professional accountability and responsibility, misconduct
5. Differences between professions and importance of team efforts
6. Cultural issues in the healthcare environment

Research Methodology and Biostatistics

The objective of this is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

Principals of Management

The course is intended to provide a knowledge about the basic principles of Management.
1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams
8. Leadership
9. Time Management
10. Cost and efficiency

Community orientation and clinical visit

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations. [27]

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical college, private hospitals, dispensaries and clinics.
2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

Second Semester

Health Information Management – I:
I. Characteristics of quality Health Information Management:
- Definition, Characteristics of 'Good' Medical Record
- Values of 'Good' Medical Record to various users
- Required Characteristics of entries in medical Records
- Source-oriented, Problem-oriented, and Integrated medical records
- Medical Record Forms and their Content
- Standard Order of Arrangement of Medical Record forms
- Analysis of Medical Record-Quantitative & Qualitative
- Incomplete Record Control
- Practical: Actual handling of medical records

II. Medical Records for different patient encounters with health care facility
- Ambulatory Care Records {Emergency & Outpatient Records]
- Clinical Records in Long Term Care and Rehabilitation Facilities
- Mental Health Records

III. Filing Methods, Storage, and Retention
- Numbering and Filing Systems
- Filing
- Storage- Microfilming and Disk Storage
- Retention
- Registers & Indexes
- Record movement control & Tracking system

IV. Organizational Aspects of Health Information Management Department/Services
- Policies
- Functions
- Location, Space and Layout
- Equipment
- Forms Designing and Control
- Medical Records Flow and Processing

V. Organizational Aspects of the Centralized Admitting Services
- Principles of Identification of a Patient
- Methods of Collection of Identification Data
- Types of Central Admitting Services
- Admitting Policies
- Procedure Outlines for Admissions
- Flow of Records following Admissions
- Advantages of good Admitting Policies and Procedures
- Pre-requisites for smooth & efficient functioning of the Centralized Admitting Services

VI. Medical Record Department Management
- Planning, Organizing, Directing and Controlling
- Personnel
- Principal Responsibilities and Duties of the Medical Record Administrator/Director
- Tools of Management in the Hands of the Medical Record Administrator/Director

VII. Intradepartmental and Interdepartmental Relationships
- Developing Intradepartmental Relationship
- Developing Interdepartmental Relationships with various Departments of the Hospital

VIII. Quality Management
- External and Internal Pressures for quality
- Quality Assessment and Quality Improvement
- Quality Assurance & Medical Care Evaluation
- Utilization management
- Peer Review
- Utilization review processing & outcomes of Utilization management
- Risk management program [Organization & Operation

- International Standards Organization [ISO], Quality Council of India, & National Accreditation Board of Hospitals [NABH]

IX. Heath Care Statistics, Quality control of Data Collection & Presentation
- Incomplete Record Control
- Inpatient census and rates computed from it.
- Ambulatory care statistics
- Long term Care Statistics
- Processing and reporting of Reproductive Health Statistics
- Reporting of Notifiable Diseases to Public Health Authorities

X. Medico-Legal Aspects of Health Information Management
- Medical Ethics, Hippocratic Oath, and Code of Ethics for the HIM Professionals
- Ownership of the Medical Record
- Privileged Communication and confidentiality of Medical Records
- Release of Information: To the Patient, To Authorized Persons /Agencies Legal Implications of release of Information to unauthorized, Persons/Agencies.
- Consents: Different types and their validity, invalidity blanket, and improper consents.
- Corrections in identification data medical documentations
- Rights and responsibilities of patients
- Medical Record in a Court of Law
- Legal requirements in Retention of Medical Records

Anatomy, Physiology, & lab science:
Understand the technical functions of various organs and systems of the body
Acquire knowledge about various body fluids, hormones and enzymes Topics Covered:
- Integumentary system,
- Musculoskeletal system,
- Respiratory system,
- Cardiovascular system,
- Blood and lymphatic system,
- Digestive system,
- Urogenital systems
- Nervous system,
- Organs of special sense.

General statistics & Biostatistics:
General Bio-statistics

- Definition of Statistics and Biostatistics
- Frequency Distribution: Measures of Central Tendency – Arithmetic Mean, Median and Mode for un-grouped and grouped data
- Presentation of data: Bar diagram, Pie Diagram, Histogram, Frequency polygon, Frequency curve, and Line diagram.
- Measures of Variation: Range, Inter Quartiles, Mean Deviation, Standard Deviation Co-efficient of Variation

- Probability: Definitions of Classical Probability (Priori) and Frequency, Probability (Posteriori), Addition and Multiplicative Theorems of Probability
- Probability Distribution: Binomial distribution, Poisson distribution and Normal distribution
- Sampling- Definition: Population and simple Sampling, Simple Random Sampling, Stratified Random Sampling, Systematic Random Sampling and Cluster Sampling
- Correlation and Regression: Scatter Diagram, Linear Correlation and Linear Regression Equation Test of Significance – Procedure Test of Significance for large samples and for small samples Chi-square Test – Testing for association Misuse of Chi-square Test

Hospital Statistics

- Definition of hospital statistics and important Hospital Terms
- Sources of Hospital Statistics – Registers, Medical Records and Daily Ward Census
- Analysis of Hospital Services and Discharges ¬ Important Rates, Ratio and Percentages with Formula
- Uses and Limitations of Hospital Statistics
- Hospital Statistics Reporting
- Practical: Hands-on training in hospital statistics – collection and analysis

Communication skills:
- Basics of Communication: Process of and models of communications,
- Types of communications: a). Oral communication b). Written Communication c). Non-verbal communication & Body language, Barriers to communications
- Reading Skills: ¬Types of readings: Skimming, Scanning, intensive / loud / silent reading, map reading ¬ Sample passages for reading with comprehension exercises ¬ Tables and Graphic Organizers
- Listening skills ¬ Definition of listening ¬Types of Listening ¬ Purposes of listening ¬ Obstacles for listening ¬Contexts of listening ¬To be a good listener ¬ Listening to a Lecture
- Speaking Skills: Formal & Informal Conversation: Agreeing, Emphasizing, thinking ahead, correcting oneself, interrupting, politely expressing reservations, opinions, disagreeing, accepting invitations declining invitations etc. Telephone Conversation and Interviews

Medical Terminology – II:
I. Introduction to Medical Terminology

1. Definition and Origin of Medical Terms.
2. Components of Medical Terms
3. Prefixes
4. Suffixes
5. Roots and Combining forms
6. External Anatomy and Internal Anatomy
7. Additional Lists and their combining forms grouped as: Verbs, Adjectives, Body Fluids, Body Substances, Chemicals, Colours and Phobias

II. Terms Relating to the Body as a Whole

1. Study of the Body
2. Basic Structures
3. Cells
4. Tissues
5. Organs
6. Systems
7. Directions
8. Anatomic Planes and Position

III. The Skeletal System

1. Pathologic conditions (Inflammations and Infections)
2. Hereditary, Congenital and Developmental Disorders
3. Fractures
4. Metabolic and Deficiency Diseases
5. Symptomatic Terms
6. Diagnostic Terms
7. Oncology Terms
8. Operative Terms
9. Laboratory Tests and Procedures
10. Standard Abbreviations

IV. The Muscular System

1. Pathologic Conditions
2. Degenerative and Innervative Disorders
3. Hereditary, Congenital and Developmental Disorders
4. Symptomatic Terms
5. Diagnostic Terms
6. Oncology Terms
7. Operative Terms
8. Laboratory Tests and Procedures.
9. Standard Abbreviations

Third Semester

International Classification of Diseases (ICD-10) and Surgical Procedures (ICD-9CM) and SNOMED-CT:

- Coding of final diagnosis and secondary diagnosis.
- Disease and operation nomenclatures, International Classification of Disease 10, International Classification of Disease – 9CM indexing of patient care data.
- Introduction and usage of International Classification of Disease in practicals
- International Classification of Diseases
- ICD-10, ICD-9 CM (Surgical Procedures)

- CPT – Current Procedural Terminology (Introduction)
- HCPCS – Healthcare Common Procedure Coding System (Introduction)
- ICD-10 - Alpha-numeric coding
- Volume 1 – Tabular list
- Volume 2 – Instruction manual
- Volume 3 – Alphabetical Index
- Classification of Diseases according to Clinical Pertinence
- ICD-9CM (Procedure) coding – International Classification of Diseases – Clinical modification
- CPT – Introduction of CPT and HCPCS – 3 levels of codes
- SNOMED-CT

Health Information Management – II:

Health Information Management serves the healthcare industry and the public by managing, analyzing, and utilizing the data vital for patient care and making the data accessible to healthcare providers. Enhancing individual patient care through timely and relevant information is one of the primary goals for the Health Information Management Technology.

1. Development of Health Care Information
   - Health Care Information standards, Paper based Health Records, Computer based patient records, Ethical issues in Health Information Management
2. Comparative data
   - Research methods, Clinical quality management
3. Management of Health Information Services
   - Principles of Management and Leadership, Work Design and Performance improved, Human Resources Management, Training and Development, Project Management, Strategic Management.

Special Lectures:

Medical Language & Classification Systems

Subject expose student to the healthcare vocabularies and also the representation of clinical data through the use of medical vocabularies and clinical classification systems. Emphasis is on developing expertise in identifying appropriate clinical classification systems and medical vocabularies, identifying their appropriate uses and sources, and applying them within and among health information systems to promote effective communication. Standard clinical terminologies including SNOMED, ICD 10, ICD-9-CM, ICD-10-CM, and ICD-9-PCS, ICPM, CPT/HCPCS, National Drug Codes and healthcare vocabularies and clinical terminologies in the electronic health record.

Change Leadership

Develop a systems-based way of thinking about leadership and how people function in the workplace, self-assess leadership thinking and behavior, establish goals for a higher level of leadership functioning, and integrate System-based Leadership and Change Management with models of change management and transition. Also, identify patterns of behavior that sabotage change in your system and internalize behavior for leading change in the organization.

Standard documentation Practices & Implementation

Subject covers components of EHR implementation as identified through case studies of best practices. Examine how the EHR impacts patient care through the availability of information and clinical decision support, create and use rules and clinical protocols/tools for the EHR, and develop training methodologies.

Fourth Semester

Computer Skills:

1. The Internet
- Define the Internet
- How the Internet works
- Internet capabilities and limitations
- How to connect to the Internet via modem ISDN, etc.
- Navigate the World Wide Web
- Identify services and tools offered on the Internet
- Use services and tools offered on the Internet
- Explain book marks
- Safety

2. Email
- Define electronic mail
- Compose electronic messages
- Send electronic messages using appropriate format
- Transmit document using electronic mail system

3. Basic knowledge of networks
- Explain communications standards
- Describe network structures
- Explain network types and protocols
- Explain network connectivity
- Explain the function of servers in a graphic network
- Describe various network operating systems
- Explain the difference between network software and individual use software
- Use a network to access, file, and store files

4. Information processing activities
- Key, process, print and store text and data information using integrated software
- Troubleshoot basic computer malfunctions
- Load media devices
- Set up print devices
- Operate scanner devices
- Operate Print devices
- Maintain print devices
- Monitor peripheral equipment operations

5. Operating Systems

- Identify operating systems and their attributes (i.e., DOS, Unix, Macintosh, Windows)
- Identify the advantages and disadvantages of the computer to individuals and business.
- Identify the roles and equipment used for input, processing, and output in an information system.
- Identify correct safety procedures

6. Demonstrate basic computer literacy
- Create directories/folders and sub-directories
- Format disks
- Manipulate files (copy, rename, delete)
- Keyboard proficiently by touch

Hospital Organization & Administration:
1. Introduction to Hospital Administration
    a) Who's Who in hospital – Key administrators and their functions, overview of medical and para-medical specialties, main service departments:
    b) Overview of health services – government services: private & not for profit: primary, secondary & tertiary health care: types of hospital: community, super-specialty etc.
2. Principles of Organizational Management
    a) Culture, Values and Mission
    b) Organizational Structure
    c) Planning and Controlling
    d) Hospital Organizational Structures – Government, Private and Not for Profit.
3. Managing People (Human Resources)
    a) Overview – scope and functions of HR dept., HR planning
    b) Recruitment and Appointment
    c) Training and Development
    d) Goal setting, rewards systems and motivation
    e) Performance Appraisal
    f) Promotion, internal transfers
    g) Problems and Legal issues
    h) Leadership
    i) Working in teams
4. Clinical Services
    a) Overview of clinical departments and services – OPD, In-patients, ICU, Surgical, Emergency, Community/family Health, Paramedical & Rehabilitation
    b) Types of doctors, their training, roles and responsibilities
    c) The role & responsibilities of the HOD
    d) Medical Audit
    e) Medical Negligence & Litigation
5. Nursing Services and Wards
    a) Objectives of the nursing service
    b) Nursing service organization, types of nurses, their training, qualifications and functions, other ward staff, personnel issues.
    c) Ward management

6. Product-based services
    a) Pharmacy purchasing and stores
    b) Pharmacy dispensing
    c) Prosthetics & Orthotics
7. Diagnostic Services (Radiology, Laboratories, Blood Bank etc.)
    a) Overview – main services and their functions
    b) In-house services
8. Patient Services (non-medical)
    a) Reception, Welcome/Help Desk
    b) Patient facilities, wheelchairs, Ambulances
    c) Public Relations – objectives, functions, policies, different media, methodologies, networking
9. Managing Support Services
    a) Overview of functions of all support services including Laundry, Catering, Cleaning, CSSD, Transport, Security, Materials (Purchase and Stores) etc.
    b) Functions of GS Office
10. Hospital Infrastructure (Buildings and Plant)
    a) Civil Engineering – Planning and maintaining buildings, water & sewage
    b) Electrical Engineering
    c) Mechanical Engineering, Equipment Maintenance, Medical Gases, etc.
    d) Biomedical Engineering
11. Hospital Information Systems
    a) Analysing information requirements
    b) Reporting systems
    c) Early warning systems
    d) Computerized Systems, intranet
12. Managing the Organization (putting it all together)
    a) Planning: strategy and corporate planning
    b) Dealing with risk and uncertainty
    c) Organizational Development and Change management
    d) Corporate Governance & legal matters
    e) Relationships with other institutions and organizations

Special Lectures:
Quality Management in Health Services (Quality Assurance in healthcare)
Subject covers diverse perspectives in quality management and regulation including relevant research and management methodologies of quality, cost and access to healthcare with a focus on the role of health information management. Overview of performance improvement, methods and applications in the area of outcomes research including practice variation, risk adjustment, quality measures and quality management (or quality improvement), practice guidelines, evidence-based medicine, clinical decision support, health-related quality of life, utility assessment, economic evaluations (including cost- effectiveness studies).

Legal Issues in Health Information Technology and Systems

Examination of legal issues related to electronic-based health information; the growth of computer and communication technologies, including privacy, security, electronic data interchange and compliance related issues; policy, regulatory and related concerns; interpretation and implementation of enterprise information policy. Principles of law applied to the health field with emphasis on federal, state, and local laws affecting health information management practice, confidentiality, and security of information.

Leadership for Health Information Technology and Systems

Strategic management and planning, change management, leadership in e-health environment, project management including planning, scheduling, monitoring and reporting, process modeling. This course builds on the foundations of health information management or other professional preparation. Discussion of implementation of electronic health record systems, systems analysis from the enterprise level will be the focus of the class. Students are expected to develop a systems-thinking approach to leading health IT projects.

Fifth Semester

Internship:

The internship will span 6 months/ 1 semester.

As a part of this, the students will choose a relevant subject and prepare an in-depth project report of not less than 1000 words which will be handed over to the supervisor or trainer. The report can include objective, scope of the project and an in-depth report.

Skills-based outcomes and monitorable indicators for Health Information Management Assistant

S. No.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
1	Verify the documentation in the health record is timely, complete, and accurate	Basic health record forms Completeness of health records Assembling and deficiency checking	Is able to verify the accuracy of data collected and assemble into a complete health record	100
2	Collect and maintain health record data	Basic data generated from medical records and its purpose and uses	Is able to liaise with patients and their families to collect the necessary data	200
3	Apply mortality and morbidity codes as per the guidelines	ICD classification system	Is able to use the ICD system effectively	200
4	Identification of the legal use of health records and relevant documents	Legal requirements of managing and maintaining health records	Demonstrates the ability to identify legal implications of documents	100
5	Identification of discrepancies between documentation and disease coding	Minimum entry requirements in the health records	Demonstrates the ability to identify discrepancies in documentation	100
6	Comply with ethical aspects of health records and the information it contains	Confidentiality and privacy aspects of health records	Demonstrates the ability to uphold the confidentiality and privacy of patient records	100
7	Utilize basic descriptive, institutional healthcare statistics	Basic hospital statistics calculation and data requirements	Is able to perform basic statistical calculations and document results	200
	TOTAL			**1000**

4.2 Bachelor of Science in Health Information Management

(B.Sc. HIM)

B. Sc. in Health Information Management

Introduction:
Objectives/aim of the course:

The course is designed to acquire sufficient knowledge of the prevailing system of scientific documentation with computerization, information search and retrieval; to get familiar with large databases dealing with various entities such as diseases, pathological conditions, symptoms, drugs & concepts such as data mining; to learn the classification & codification of drugs, diseases & their treatment; to acquire knowledge of the current trends in Health Information Management like health insurance, third party payers and document scanning etc.

Expectation from the future graduate in the providing patient care:
On completion of this course, the students will be able to:
- Evaluate knowledge of practice relevant to health information management.
- Use formal research as a tool to evaluate and develop practice.
- Identify his/her professional learning and developmental needs.
- Work collaboratively with other health care professionals to achieve a quality service.
- Enable health care organization for better management of patient information
- Support health care administrators in routine activities
- Apply the knowledge obtained on specialized areas effectively in the health care system.
- Use interpersonal skills to facilitate effective communication with various health care professionals
- Develop health information standards according to the health care requirements
- Apply analytical and reflective skills to evaluate and improvise professional practice.
- Uphold legal ethical standards within his/ her profession

Eligibility for admission:
Pass in 12th class of 10 +2 of CBSE or equivalent with minimum aggregate of 55% marks in physics**,** chemistry and biology provided the candidate has passed in each subject separately. A candidate also must have passed in English (Core or selective or functional) as a subject of studies in the qualifying examination.

<div align="center">OR</div>

Diploma in Health Information Management after Pass in 12th class of 10 +2 of CBSE or equivalent with minimum aggregate of 50% marks in physics chemistry and biology provided the candidate has passed in each subject separately. A candidate also must have passed in English (CORE or selective or functional) as a subject of studies in the qualifying examination.

<div align="center">OR</div>

Candidates with two years diploma from a recognized Government Board in a subject for which the candidate desires to enroll, in the respective Allied Health Sciences course and shall have passed plus 12 [10+2] with Physics, Chemistry and Biology, as principal subjects or candidates with 3 years diploma from a recognized Government Board in a subject for which the candidate desires to enroll, in the respective Allied Health Sciences course & should have studied Physics, Biology and Chemistry as principal subjects during the tenure of the course.

Selection procedure

1. Admission to B.Sc. Health Information Management course shall be made on the basis of eligibility and an entrance Test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

2. Successful candidates on the basis of written Test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of Health Information Management and Head of the Institution, whose recommendations shall be final for the selection of the students.

3. During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

4. Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

5. The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Provision of Lateral Entry:

Lateral entry to second year for allied health science courses for candidates who have passed diploma program from the Government Boards and recognized by State/Central University, fulfilling the conditions specified and these students are eligible to take admission on lateral entry system only in the same subject studied at diploma level

Duration of the course

Duration of the course: 3 academic years or 6 semesters (2205 hours of Theory, 785 hours of Practical Classes, 220 hours of clinical posting) and 2000 hours of compulsory internship.

Total hours - 5210

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance:

- No candidate shall be permitted to appear for any one of the parts of BSc. HIM degree course examinations, unless he/ she has attended the course in the subject for the prescribed period in an affiliated Institution recognized by this University and produces the necessary certificate of study, attendance, satisfactory conduct and progress from the Head of the Institution.

- A candidate is required to put in a minimum of 75% of attendance in both theory papers and 90% practical separately in each subject before admission to the examination. This relaxation in attendance includes for medical & any other reasons approved by the head of the Institution.

- A candidate lacking in the prescribed attendance and progress in any one of the subjects in theory and practical in the first appearance shall not be permitted for admission to the entire examination.

Marks Qualifying for a Pass

A candidate shall be declared to have passed the examination if he or she obtains the following qualifying marks:

50% marks in the university examination and 50% marks in internal assessment evaluated by the department.

Practical examination and 50% aggregate in practical and 50% internal evaluation marks evaluated by the department.

Evaluation & Grading system criteria

Evaluation & grading **(Manual Relative grading)** of students shall be based on **GPA** (Grade point average) & **CGPA** (Cumulative grade point average).

Evaluation weightage

The final evaluation and grading for each subject shall be based on internal assessment components (50 percent weightage) and semester end examination (50 percent weightage) conducted by the University.

Weightage distribution

Item	Weightage (%)
Class participation/presentation	20%
Assignment & quizzes	10%
Sessional exams	20%
Semester end University exam	50%
Total	100%

Letter Grading System

Letter Grade	Credit value (Grade Value)
A+	10
A	9
B	8
C	7
D	6
E	5
F	0

Credit Details:

Lectures: 1 hour/week = 1 Credit

Tutorials: 1 hour/week = 1 Credit

Practical: 2 hours/week = 1 Credit

Project: 30hours/week = 1 Credit

Credit Includes: L – Lectures, T- Tutorials, P- Practical, and PR – Project.

Carrying Over of Failed Subjects

   a. Candidates are permitted to carry over the failed subjects in first year to second year, second year to third year.

b. Candidates will be permitted to appear for the examination in the third year only after passing all the subjects in first and second year.

The three year degree course in Health Information Management is designed to prepare the student for a professional career in Medical Record Administration and Health Information Management of any modern health care delivery system or care providers

Undergraduate Program Requirements - Credits

140 credits are required for the B. Sc. in Health Information Management course of 4 years with 6 months of internship included.

Model Curriculum Outline

First Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BHIM-001	Introduction to Healthcare Delivery System in India	60	0	60
BHIM-002	Basic computers and information Science	10	40	50
BHIM-003	Communication and soft skills	20	10	30
BHIM-004	Medical Terminology and Record keeping (including anatomical terms)	40	0	40
BHIM-005	Medical Law and Ethics	40	0	40
BHIM-006	Introduction to Quality and Patient safety (including Basic emergency care and life support skills, Infection prevention and control, Biomedical waste management, Disaster management and Antibiotic resistance)	40	60	100
BHIM-007	Professionalism and values	20	0	20
BHIM-008	Research Methodology and Biostatistics	40	20	60
BHIM-009	Principals of Management	40	0	40
BHIM-010	Community orientation and clinical visit (including related practical to course 001)*	0	100	100
	TOTAL	310	230	540

Teaching resources (tutors) should be made available at every institute for basic subjects such as – Biology and English for students who wish to undertake the extra classes for the same.

Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BHIM-009	Pre and Para clinical subjects	120	-	150
BHIM-010	Medical Terminology – II	200	20	220
BHIM-011	Communication skills (English for Health professionals)	50	25	75
BHIM-012	Bio-Statistics, Hospital Statistics	75	20	95
	TOTAL	445	65	510

Third Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
BHIM-013	Health Information Management – I	180	60	240
BHIM-014	Information Technology	110	40	150

Sl. No.	Course Titles	Hours		
		Theory	**Practical**	**Total**
BHIM-015	Fundamentals of Management	90		90
BHIM-016	Professional Practice in Health Information Management	20	10	30
BHIM-017	HIM Practicum – 2		30	30
TOTAL		400	140	540

Fourth Semester

Sl. No.	Course Titles	Hours		
		Theory	**Practical**	**Total**
BHIM-018	Health Information Management II & Nomenclature	130	60	190
BHIM-019	Organizational Development and Planning in Health Information Management	130	60	190
BHIM-020	Electronic Health Records	80	20	100
BHIM-021	Quality Assurance in healthcare	20	10	30
BHIM-022	Healthcare financing	20	10	30
TOTAL		380	160	540

Fifth Semester

Sl. No.	Course Titles	Hours			
		Theory	**Practical**	**Clinical Posting (Hours)**	**Total**
BHIM-023	Fundamentals of Health Informatics & Data Security	60	10	10	80
BHIM-024	International Classification of Diseases (ICD-10) and Surgical Procedures (ICD-9CM), CPT, HCPCS and SNOMED-CT	90	30	30	150
BHIM-025	Hospital Organizations and Administration and Medical Ethics and Consumer Protection Act	90	30	30	150
BHIM-026	Healthcare Policies & Standards	60			60
BHIM-027	Human Resource Management	30		10	40
BHIM-028	Procedure coding system/s (ICPM, CPT, PCS)	20	20	20	60
TOTAL		350	90	100	540

Sixth Semester

Sl. No.	Course Titles	Hours			
		Theory	**Practical**	**Clinical Posting (Hours)**	**Total**
BHIM-029	Hospital Accounting and Financial Accounting, Health Insurance and Billing Design	110	50	40	200
BHIM-030	Health Information Management II, Medical Transcription and Telemedicine (Th + Pr)	120	50	40	210
BHIM-031	Application of HIM in Non-traditional Settings	90		40	130
TOTAL		320	100	120	540

Seventh and Eighth Semester-INTERNSHIP/EXTERNSHIP – 2000 hours

Foundation course

Introduction to National Healthcare System

The course provides the students a basic insight into the main features of Indian health care delivery system and how it compares with the other systems of the world. Topics to be covered under the subject are as follows:

1. Introduction to healthcare delivery system
   a. Healthcare delivery system in India at primary, secondary and tertiary care
   b. Community participation in healthcare delivery system
   c. Health system in developed countries.
   d. Private Sector
   e. National Health Mission
   f. National Health Policy
   g. Issues in Health Care Delivery System in India
2. National Health Programme- Background objectives, action plan, targets, operations, achievements and constraints in various National Heath Programme.
3. Introduction to AYUSH system of medicine
   a. Introduction to Ayurveda.
   b. Yoga and Naturopathy
   c. Unani
   d. Siddha
   e. Homeopathy
   f. Need for integration of various system of medicine
4. Health scenario of India- past, present and future
5. Demography & Vital Statistics-
   a. Demography – its concept
   b. Vital events of life & its impact on demography
   c. Significance and recording of vital statistics
   d. Census & its impact on health policy
6. Epidemiology
   a. Principles of Epidemiology
   b. Natural History of disease
   c. Methods of Epidemiological studies
   d. Epidemiology of communicable & non-communicable diseases, disease transmission, host defense immunizing agents, cold chain, immunization, disease monitoring and surveillance.

Medical terminologies and record keeping

This course introduces the elements of medical terminology. Emphasis is placed on building familiarity with medical words through knowledge of roots, prefixes, and suffixes. Topics include: origin, word building, abbreviations and symbols, terminology related to the human anatomy, reading medical orders and reports, and terminology specific to the student's field of study. Spelling is critical and will be counted when grading tests.[24]

Topics to be covered under the subject are as follows:

1. Derivation of medical terms.
2. Define word roots, prefixes, and suffixes.
3. Conventions for combined morphemes and the formation of plurals.
4. Basic medical terms.
5. Form medical terms utilizing roots, suffixes, prefixes, and combining roots.
6. Interpret basic medical abbreviations/symbols.
7. Utilize diagnostic, surgical, and procedural terms and abbreviations related to the integumentary system, musculoskeletal system, respiratory system, cardiovascular system, nervous system, and endocrine system.
8. Interpret medical orders/reports.
9. Data entry and management on electronic health record system.

Basic computers and information science

The students will be able to appreciate the role of computer technology. The course has focus on computer organization, computer operating system and software, and MS windows, Word processing, Excel data worksheet and PowerPoint presentation. Topics to be covered under the subject are as follows:

1. Introduction to computer: Introduction, characteristics of computer, block diagram of computer, generations of computer, computer languages.
2. Input output devices: Input devices(keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision-input devices), output devices(monitors, pointers, plotters, screen image projector, voice response systems).
3. Processor and memory: The Central Processing Unit (CPU), main memory.
4. Storage Devices: Sequential and direct access devices, magnetic tape, magnetic disk, optical disk, mass storage devices.
5. Introduction of windows: History, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows (opening, closing, moving, resizing, minimizing and maximizing, etc.).
6. Introduction to MS-Word: introduction, components of a word window, creating, opening and inserting files, editing a document file, page setting and formatting the text, saving the document, spell checking, printing the document file, creating and editing of table, mail merge.
7. Introduction to Excel: introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs.
8. Introduction to power-point: introduction, creating and manipulating presentation, views, formatting and enhancing text, slide with graphs.
9. Introduction of Operating System: introduction, operating system concepts, types of operating system.
10. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.
11. Internet and its Applications: definition, brief history, basic services (E-Mail, File Transfer Protocol, telnet, the World Wide Web (WWW)), www browsers, use of the internet.

12. Application of Computers in clinical settings.

Practical on fundamentals of computers -
    1. Learning to use MS office: MS word, MS PowerPoint, MS Excel.
    2. To install different software.
    3. Data entry efficiency

Medical law and ethics

Legal and ethical considerations are firmly believed to be an integral part of medical practice in planning patient care. Advances in medical sciences, growing sophistication of the modern society's legal framework, increasing awareness of human rights and changing moral principles of the community at large, now result in frequent occurrences of healthcare professionals being caught in dilemmas over aspects arising from daily practice.[25]

Medical ethics has developed into a well based discipline which acts as a "bridge" between theoretical bioethics and the bedside. The goal is "to improve the quality of patient care by identifying, analyzing, and attempting to resolve the ethical problems that arise in practice".[25] Doctors are bound by, not just moral obligations, but also by laws and official regulations that form the legal framework to regulate medical practice. Hence, it is now a universal consensus that legal and ethical considerations are inherent and inseparable parts of good medical practice across the whole spectrum. Few of the important and relevant topics that need to focus on are as follows:

1. Medical ethics - Definition - Goal - Scope
2. Introduction to Code of conduct
3. Basic principles of medical ethics – Confidentiality
4. Malpractice and negligence - Rational and irrational drug therapy
5. Autonomy and informed consent - Right of patients
6. Care of the terminally ill- Euthanasia
7. Organ transplantation
8. Medico legal aspects of medical records – Medico legal case and type- Records and document related to MLC - ownership of medical records - Confidentiality Privilege communication - Release of medical information - Unauthorized disclosure - retention of medical records - other various aspects.
9. Professional Indemnity insurance policy
10. Development of standardized protocol to avoid near miss or sentinel events
11. Obtaining an informed consent.

Communication and soft skills

Major topics to be covered under Communication course[26] –

1. Basic Language Skills: Grammar and Usage.
2. Business Communication Skills. With focus on speaking - Conversations, discussions, dialogues, short presentations, pronunciation.
3. Teaching the different methods of writing like letters, E-mails, report, case study, collecting the patient data etc. Basic compositions, journals, with a focus on paragraph form and organization.

4. Basic concepts & principles of good communication
5. Special characteristics of health communication
6. Types & process of communication
7. Barriers of communication & how to overcome

Introduction to Quality and patient safety

1. Quality assurance and management - The objective of the course is to help students understand the basic concepts of quality in health Care and develop skills to implement sustainable quality assurance program in the health system.
   a. Concepts of Quality of Care
   b. Quality Improvement Approaches
   c. Standards and Norms
   d. Quality Improvement Tools
   e. Introduction to NABH guidelines

2. Basics of emergency care and life support skills - Basic life support (BLS) is the foundation for saving lives following cardiac arrest. Fundamental aspects of BLS include immediate recognition of sudden cardiac arrest (SCA) and activation of the emergency response system, early cardiopulmonary resuscitation (CPR), and rapid defibrillation with an automated external defibrillator (AED). Initial recognition and response to heart attack and stroke are also considered part of BLS. The student is also expected to learn about basic emergency care including first aid and triage. Topics to be covered under the subject are as follows:
   a. Vital signs and primary assessment
   b. Basic emergency care – first aid and triage
   c. Ventilations including use of bag-valve-masks (BVMs)
   d. Choking, rescue breathing methods
   e. One- and Two-rescuer CPR
   f. Using an AED (Automated external defibrillator).
   g. Managing an emergency including moving a patient

   At the end of this topic, focus should be to teach the students to perform the maneuvers in simulation lab and to test their skills with focus on airways management and chest compressions. At the end of the foundation course, each student should be able to perform and execute/operate on the above mentioned modalities.

3. Bio medical waste management and environment safety- The aim of this section will be to help prevent harm to workers, property, the environment and the general public. Topics to be covered under the subject are as follows:
   a. Definition of Biomedical Waste
   b. Waste minimization
   c. BMW – Segregation, collection, transportation, treatment and disposal (including color coding)
   d. Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste
   e. BMW Management & methods of disinfection
   f. Modern technology for handling BMW
   g. Use of Personal protective equipment (PPE)

      h.   Monitoring & controlling of cross infection (Protective devices)

4. Infection prevention and control - The objective of this section will be to provide a broad understanding of the core subject areas of infection prevention and control and to equip AHPs with the fundamental skills required to reduce the incidence of hospital acquired infections and improve health outcomes. Concepts taught should include –
   a. Evidence-based infection control principles and practices [such as sterilization, disinfection, effective hand hygiene and use of Personal protective equipment (PPE)],
   b. Prevention & control of common healthcare associated infections,
   c. Components of an effective infection control program, and
   d. Guidelines (NABH and JCI) for Hospital Infection Control

5. Antibiotic Resistance-
   a. History of Antibiotics
   b. How Resistance Happens and Spreads
   c. Types of resistance- Intrinsic, Acquired, Passive
   d. Trends in Drug Resistance
   e. Actions to Fight Resistance
   f. Bacterial persistence
   g. Antibiotic sensitivity
   h. Consequences of antibiotic resistance
   i. Antimicrobial Stewardship- Barriers and opportunities, Tools and models in hospitals

6. Disaster preparedness and management- The objective of this section will be to provide knowledge on the principles of on-site disaster management. Concepts to be taught should include-
   a. Fundamentals of emergency management,
   b. Psychological impact management,
   c. Resource management,
   d. Preparedness and risk reduction,
   e. Key response functions (including public health, logistics and governance, recovery, rehabilitation and reconstruction), information management, incident command and institutional mechanisms.

Professionalism and Values

The course on professionalism will deliver the concept of what it means to be a professional and how a specialized profession is different from a usual vocation. It also explains how relevant is professionalism in terms of healthcare system and how it affects the overall patient environment.

1. Professional values- Integrity, Objectivity, Professional competence and due care, Confidentiality
2. Personal values- ethical or moral values

3. Attitude and behavior- professional behavior, treating people equally
4. Code of conduct , professional accountability and responsibility, misconduct
5. Differences between professions and importance of team efforts
6. Cultural issues in the healthcare environment

Research Methodology and Biostatistics

The objective of this is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

1. Introduction to research methods
2. Identifying research problem
3. Ethical issues in research
4. Research design
5. Basic Concepts of Biostatistics
6. Types of Data
7. Research tools and Data collection methods
8. Sampling methods
9. Developing a research proposal

Principals of Management

The course is intended to provide knowledge about the basic principles of Management.

1. Introduction to management
2. Strategic Management
3. Foundations of Planning
4. Planning Tools and Techniques
5. Decision Making, conflict and stress management
6. Managing Change and Innovation
7. Understanding Groups and Teams
8. Leadership
9. Time Management
10. Cost and efficiency

Community orientation and clinical visit

The objective of this particular section of the foundation course is to sensitize potential learners with essential knowledge; this will lay a sound foundation for their learning across the under-graduate program and across their career. Innovative teaching methods should be used to ensure the attention of a student and make them more receptive such as group activities, interactive fora, role plays, and clinical bed-side demonstrations. [27]

1. The community orientation and clinical visit will include visit to the entire chain of healthcare delivery system -Sub centre, PHC, CHC, SDH, DH and Medical college, private hospitals, dispensaries and clinics.

2. The student will also be briefed regarding governance at village level including interaction and group discussion with village panchayat and front line health workers.
3. Clinical visit to their respective professional department within the hospital.

Second Semester

Pre and Para clinical subjects:
Basics of:
1. Human Anatomy and Physiology
2. Clinical and General Pathology
3. Biochemistry
4. Pharmacology
5. Microbiology
6. Forensic Medicine

1. Human Anatomy and Physiology
On completion of this subject, the student will be able to:
- Identify all anatomical structures of the human body
- Understand the technical functions of various organs and systems of the body
- Acquire knowledge about various body fluids, hormones and enzymes

Anatomy:
i. Integumentary system
- Epithelium – Types and functions
- Connective tissue – fibres and cells
ii. Musculoskeletal system
- Cartilage – type, structure and functions
- Bone – types, structure and blood supply
- Muscles – classification, structure and function
- Neuron – types and structure, typical spinal nerve
- Blood vessels – arteries, vein lymph vessels, lymph nodes, structure of lymph node
- Joints – classification, examples, structure of a typical synovial joint
- Classification of synovial joint
iii. Respiratory system
- Nasal Cavity, Larynx, Trachea, Thoracic Cage, Diaphragm, pleura, lungs
iv. Cardiovascular system
- Mediastinum, Pericardium, heart, blood supply and nerve supply of heart, blood vessels in thorax, thoracic duct, major arteries and veins of head and neck, Major arteries and veins of abdomen and pelvis
v. Blood and lymphatic system
vi. Digestive system
- Tongue, salivary glands, pharynx, esophagus, stomach, small intestine, large intestine, rectums and anal canal, Difference between jejunum and large intestine, difference between small and large intestine, liver, extra-hepatic biliary apparatus, pancreas
vii. Urogenital systems
- Urinary System: Kidney, Ureter, urinary bladder, urethra

- Male Reproductive System: Testes, spermatic cord, vas deferens, prostate, seminal vesicles and ejaculatory duct
- Female Reproductive System: Uterus, uterine tube, ovary

viii. Endocrine system
- Pituitary gland, thyroid gland, parathyroid gland, suprarenal gland

ix. Nervous system
- Spinal cord, Brain, External feature of medulla oblongata, cerebellum, Attachment of cranial nerve to the brain stem, Mid-brain, Diencephalon, Corpus striatum, Cerebral hemispheres, fiber system of brain, blood supply of brain, ventricle, CSF production and circulation

x. Organs of special sense
- Gross anatomy of eye; Gross anatomy of external, middle and internal ear; Skin

Physiology:
i. Basic concepts and Nerve physiology

- Transport across cell membrane: Passive transport- diffusion, facilitated diffusion, osmosis; Active transport-primary and secondary active transport
- Body fluids: Distribution of total body water, ionic composition of body fluids
- Neuron: Differences in structure and function of myelinated and unmyelinated nerve fibres
- Resting membrane potential and Action potential

ii. Muscle physiology
- Muscle: Classification, characteristic features of skeletal, cardiac and smooth muscles
- Skeletal muscle: Structure, types of muscle fibers, neuromuscular transmission, excitation contraction coupling, rigor mortis
- Smooth muscle: Types

iii. Blood
- Composition and functions of blood
- Plasma proteins and their functions
- Red Blood Cells: Erythropoiesis- Stages and regulation Hemoglobin: Normal values, variations and functions White Blood Cells: Types, normal values and functions Platelets: Normal range, functions, purpura
- Coagulation or clotting of blood: Clotting factors, Intrinsic and extrinsic mechanisms, hemophilia
- Anticoagulants: Classification and examples
- Blood groups: ABO and Rh systems, importance of blood grouping, hazards of blood transfusion, erythroblastosis fetalis
- Functions of lymph

iv. Cardiovascular system
- Structure and innervation of heart and blood vessels
- Cardiac muscle: Properties, Cardiac cycle
- Heart sounds: Differences between first and second heart sounds
- Electrocardiogram (ECG): waves, intervals and uses

- Heart rate: Normal value, variations, regulation
- Cardiac output: Definition, normal value, variations and regulation: role of heart rate, stroke volume and myocardial contractility, muscular exercise and cardiac output
- Blood pressure: Definition, normal value, factors influencing BP, short-term regulation

v. Respiratory system
- Organization: air passages, lungs, respiratory membrane
- Mechanism of breathing: Inspiration, expiration, pulmonary ventilation, alveolar ventilation
- Graphical representation of pressure changes during respiration
- Spirogram
- Oxygen transport: Forms, oxygen dissociation curve
- Carbon dioxide transport: Forms of transport, mechanism
- Regulation of respiration: neural and chemical regulation Cyanosis, hypoxia-types, types of hypoxia in which cyanosis occurs Definitions of apnea, dyspnea, asphyxia

vi. Special senses
- Vision: Cross-section of eye
- Functions of aqueous humor
- Visual pathway, visual filed defects
- Accommodation to near vision, light reflex, refractory errors of the eye
- Visual acuity
- Hearing: Structure and functions of external, middle and inner ear
- Mechanism of hearing
- Vestibular apparatus: Parts and functions
- Receptors for taste and smell sensations

2. Clinical and General Pathology
Objectives:-
- On completion of this subject, the student will be able to:
- Differentiate between symptoms and diseases
- Understand the needs of mandatory diagnostic procedures
- Demonstrate an understanding of the pathology of common diseases
- Understand various pathology laboratory reports
- Know about the possibilities and consequences of nosocomical infections, needle prick injuries etc., in a health care facility

Topics covered:
- Introduction to Pathology
  - Cell Injury: Necrosis – Definition, Types of Necrosis with examples
  - Cell Growth and Differentiation: Definition and Examples of Hypertrophy, atrophy, hyperplasia, metaplasia
- Inflammation and Repair
  - Inflammation: Definition, types of inflammation with examples

- Vascular chances: Hemodynamics change, change in vascular permeability Cellular events: Margination, adhesion, emigration, chemotaxis, phagocytosis Granulomatous inflammation
- Healing and Repair
- Granulation tissue
- Process of healing by primary intention Process of healing by secondary intention
- Factors influencing wound healing
- Infection
  - Fluid and Hemodynamics Derangements: Edema, Shock, Thrombosis, Embolism, Infarction
- Degeneration
- Neoplasia
  - Definition, nomenclature
  - Definition of dysplasia and anaplasia
  - Difference between benign and malignant tumours
  - Cause of tumours Spread of tumours Diagnosis of tumours
- Blood groups, cross-matching, transfusions
- Tests done on various body fluids and tissues
- Infectious Disease
  - Tuberculosis, Leprosy & AIDS
  - Genetics (Basic Terminology)
- Disease of red blood cells
  - Anemia: Definition, classification
  - Clinica Features, aetiology and basic investigation of Nutritional anemia & Hemolytic anemia
  - Bleeding Disorder: Classification, clinical features, basic investigation
  - Coagulation disorder: Examples, Hemophilia
  - Platelets disorder: Cause of thrombocytopenia including ITP
- Disease of white cells and lymph nodes
  - Leukemia: Definition, FAB classification, clinical features
  - Lymphoma: Definition, types and Clinical Features

3. Biochemistry
Topics covered:
i. Chemistry of the human body fluids in health and diseases
ii. Cerebrospinal fluid
iii. Clotting mechanism of the blood,
iv. Enzymes produced in the G.I.Tract,
v. Vitamins, Hormones, Proteins and Non-proteins,
vi. Nitrogenous substances, lipids, carbohydrates,
vii. Electrolytes
viii. Metabolism, acid-base balance,
ix. Normal values and ranges of biochemistry investigations

4. Microbiology
Topics covered:
i. Introduction to Microbiology,
ii. Classification and characteristics of organisms,
iii. Cultivation and identification of organisms,bacteria etc.,

iv. Disinfection,antiseptics,sanitation,
v. Immunity,
vi. Allergy
vii. Pathogenic organisms,non-pathogenic organisms,virus and fungus.

5. Pharmacology

Topics covered:
  i. Introduction to pharmacology
     - Route of Drug Administration
     - Pharmacokinetics and Pharmacodynamics
     - Drug Toxicity and Safety
     - Autonomic nervous system, including skeletal muscle relaxants
     - Introduction to ANS
     - Cholinergic drugs, Anticholinergic drugs, Neuromuscular blocking drugs and Adrenergic drugs
     - Adrenergic Receptor Antagonist
  ii. General and Local anesthetics
  iii. Hypnotics and Sedatives
  iv. Narcotic analgesics, narcotic antagonists
  v. Non-narcotic analgesics, antipyretics
  vi. Psycho-pharmacological agents
  vii. Drugs acting on autonomic nervous system
  viii. Antihistamines
  ix. Blocking agents
  x. Respiratory pharmacology, cardiovascular pharmacology, GIT
  xi. Chemotherapy
     - General aspects
     - Beta lactam antibiotics
     - Cotrimoxazole
     - Aminoglycosides
     - Tetracyclines
     - Macrolides
     - Quinolones
     - Antifungal agents
     - Antiviral drugs
     - Antitubercular drugs
     - Antileprotic drugs
     - Antimalarial drugs
     - Antiamoebic drugs
     - Anthelminthics
     - Anticancer drugs
  xii. Coagulants and anticoagulants
  xiii. Diuretics, hormones
     - Corticosteroids
     - Antidiabetic drugs
     - Thyroid and antithyroid drugs
  xiv. Chemotherapy

xv. Drug addiction
xvi. Special topics
- Standard abbreviations and symbols used in prescription
- Sources of drug information – Pharmacopeias, non-official references, MIMS, medical journals, FDA – product information
- Drug nomenclature – Chemical, generic, official and trade name
- Prescription writing

6. Forensic Medicine
Topics covered:
i. Asphyxial deaths
ii. Hanging
iii. Rape , Sodomy
iv. Gun shot injury, injury by bullets, sharp objects
v. Traffic Accidents
vi. Drowning
vii. Medico-legal aspects of wounds
viii. Wound certificate
ix. Toxicology
x. Food poisoning
xi. Medico-legal autopsy

The health information practitioner becomes involved in these ethical dilemmas to the extent that adequate documentation of events in the medical record is required.

Medical Terminology – II
This includes the fundamentals of clinical science.

On the completion of this course, the students will be able:

- To know the elements of medical words.
- To develop sense of correctness of medical terms.
- To gain an understanding of standard medical abbreviations.
- To understand the relationship between medical terms and their synonyms in common usage.
- To spell correctly the medical terms, to detect the meaning of unfamiliar medical terms, by analysis into their elements, and to follow directions given in medical phraseology
- To appreciate the logical order of medical terms, the exactness of concepts in medical terms, and the importance of medical terminology consciousness and continuous study

All the above characteristics will enable the students in:

- Developing an ability to read and understand medical records and the medical literature;
- Writing terms correctly when abstracting medical records
- Establishing accuracy in International Classification of Diseases, Surgical procedures which will be useful in statistics, medical billing, and auditing medical insurance claims.

I. Introduction to Medical Terminology

1.   Definition and Origin of Medical Terms.
2.   Components of Medical Terms
3.   Prefixes
4.   Suffixes
5.   Roots and Combining forms
6.   External Anatomy and Internal Anatomy
7.   Additional Lists and their combining forms grouped as:
     - Verbs
     - Adjectives
     - Body Fluids
     - Body Substances
     - Chemicals
     - Colours
     - Phobias

II. Terms Relating to the Body as a Whole
1.   Study of the Body
2.   Basic Structures
3.   Cells
4.   Tissues
5.   Organs
6.   Systems
7.   Directions
8.   Anatomic Planes and Position

III. The Skeletal System
1.   Pathologic conditions (Inflammations and Infections)
2.   Hereditary, Congenital and Developmental Disorders
3.   Fractures
4.   Metabolic and Deficiency Diseases
5.   Symptomatic Terms
6.   Diagnostic Terms
7.   Oncology Terms
8.   Operative Terms
9.   Laboratory Tests and Procedures
10. Standard Abbreviations

IV. The Muscular System
1.   Pathologic Conditions
2.   Degenerative and Innervative Disorders
3.   Hereditary, Congenital and Developmental Disorders
4.   Symptomatic Terms
5.   Diagnostic Terms
6.   Oncology Terms
7.   Operative Terms
8.   Laboratory Tests and Procedures.
9.   Standard Abbreviations

V. Integumentary System
1. Pathologic Conditions
2. Fungal, Viral and Parasitic Infections
3. Hereditary, Congenital and Developmental Disorders
4. Symptomatic Terms
5. Diagnostic Terms
6. Oncology Terms
7. Operative Terms
8. Laboratory Tests and Procedures

VI. The Cardiovascular System
1. Pathologic Conditions
2. Hemorrhages and related Conditions
3. Hereditary, Congenital and Developmental Disorders
4. Symptomatic Terms
5. Diagnostic terms
6. Oncology Terms
7. Operative Terms
8. Laboratory Tests and Procedures
9. Standard Abbreviations

VII. The Respiratory System
1. Pathologic Conditions
2. Symptomatic Terms
3. Diagnostic Terms
4. Oncology Terms
5. Operative Terms
6. Laboratory Tests and Procedures
7. Standard Abbreviations

VIII. The Gastro-Intestinal System
1. Pathologic Conditions
2. Hereditary, Congenital and Developmental Disorders
3. Symptomatic Terms
4. Diagnostic Terms
5. Oncology Terms
6. Surgical Procedures
7. Laboratory Tests and Procedures
8. Standard Abbreviations

IX. The Genito-Urinary System
(A) Urinary Tract
1. Pathologic Conditions
2. Hereditary, Congenital and Developmental Disorders
3. Symptomatic Terms
4. Diagnostic Terms
5. Oncology
6. Surgical Procedures

     7. Laboratory Tests and Procedures
     8. Standard Abbreviations

(B) Male Reproductive Organs
     1. Hereditary, Congenital and Developmental Disorders
     2. Sexually Transmitted Disorders (STD)
     3. Symptomatic Terms
     4. Diagnostic Terms
     5. Operative Procedures

(C) Female Reproductive Organs
     1. Hereditary, Congenital and Developmental Disorders
     2. Sexually Transmitted Disorders (STD)
     3. Symptomatic Terms
     4. Diagnostic Terms
     5. Operative Procedures
     6. Laboratory tests and Procedures

X. The Endocrine System

(Pituitary-Anterior & Posterior: Hypothalamus; Thyroid; Parathyroid; Adrenal-Cortex and Medulla; Pineal body; Pancreas; Gonads-Ovaries & Testes & Thymus)

     1. Pathologic Conditions
     2. Hereditary, Congenital and Developmental Disorders
     3. Symptomatic Terms
     4. Diagnostic Terms
     5. Oncology
     6. Surgical Procedures
     7. Laboratory Tests and Procedures
     8. Standard Abbreviations

XI. The Nervous System
(A) Neurological Disorders
     1. Pathologic conditions
     2. Hereditary Congenital and Developmental Disorders
     3. Circulatory Disturbances
     4. Other Organic Abnormalities
     5. Oncology
     6. Diagnostic Terms
     7. Surgical and other Procedures
     8. Laboratory Tests and Procedures
(B) Psychiatric Disorders
     1. Psychiatric Disorders
     2. Other Descriptive and Diagnostic Terms
     3. Various Tests
     4. Treatment Methods for Psychiatric Conditions

XII. The Sensory Organs
(B) Sense of Vision

1. Pathologic conditions
2. Hereditary, Congenital and Developmental Disorders
3. Diagnostic Terms
4. Operative terms
5. Oncology
6. Vision Tests and Procedures

(C) Sense of Hearing
1. Pathologic condition
2. Hereditary, Congenital and Developmental Disorders
3. Oncology
4. Surgical Procedures
5. Hearing Tests.

(D) Sense of Smell
2. Pathologic and Other terms
3. Laboratory Tests

(E) Sense of Taste
2. Pathologic and Other terms

(F) Touch and Other Cutaneous Senses
2. Terms referring to these senses

XIII. Multiple-System Diseases
1. Inflammations and Infections
2. Symptomatic Terms
3. Diagnostic Terms
4. Laboratory Tests and Procedures

Communication skills:

I. Basics of Communication:
- Process and models of communications
- Types of communications:
    - Oral communication (Verbal, telephonic, face-to-face)
    - Written Communication
    - Non-verbal communication & Body language
- Barriers to communications
- How to improve communication and spoken skills

II. Reading Skills:
- Sources of Information
- Types of readings: Skimming, Scanning, intensive / loud / silent reading, oral, extensive, map reading
- Understanding what to read- Part played by propositions
- Techniques of reading 3Q3R
- Sample passages for reading with comprehension exercises
- Tables and Graphic Organizers

III. Listening skills
- Definition of listening
- Types of Listening

- Purposes of listening
- Obstacles for listening
- Contexts of listening
- To be a good listener
- Listening to a Lecture
- Factors helping listening: Semantic markers, focused listening
- Facilitating understanding
- Static & process description- gambits

IV.   Speaking Skills
- Formal & Informal Conversation: Agreeing, Emphasizing, thinking ahead, correcting oneself, interrupting, politely expressing reservations, opinions, disagreeing, accepting invitations declining invitations etc.
- Telephone Conversation
- Interviews
- Visual Presentation

V.   Writing Skills
- Objectives- Difference between spoken and written form
- How words are formed into phrases and clauses
- Tenses, Abbreviations, Punctuations
- Writing Sentences
- Writing Paragraphs: The Development of a Paragraph
- Cohesion, Coherence
- Summary, essay writing, précis writing
- Formal Letters – personal, applications, bio-data,
- Official correspondence: Outgoing correspondence, replying incoming correspondence, writing circulars, notices, charge memos
- Writing Reports
- Informal letters
- Tables, Charts and Graphs
- Medical Transcription

VI.   Study Skills
- Improving Study Skills
- Note Taking: Some Basic Devices, Visual aids
- Writing Summaries, observation reports, and action plan

VII.   Effective communication in Hospitals:
- Communicating to match the mission and vision of the institution
- The strategy of keep informed
- The nature of communications in a hospital
- Upward and Downward Communications
- Reporting of feedbacks
- Intra and interdepartmental communications
- Communications with Medical Staff, Paramedical staff and Support Services Staff

- The care provider – customer relationship
- Patient as VIP and his rights; Patient's locus standing, his agony, pains and tensions
- Directing patients to right destinations
- Giving hope to the hopeless
- Communications with the sick and injured
- Communications with teens and youngsters, middle aged and the aged
- Keeping up good impressions and manners before patients and their attendants
- Body language – How can you say it better than words?
- Communicating practically and technically feasible solutions
- How to say "no" graciously?
- Effective Intra and interdepartmental communications
- Common problems arising out of bad quality communications and troubleshooting techniques

Bio-Statistics, Hospital Statistics:

Bio-statistics

- Definition of Statistics and Biostatistics
- Role of statistics in Health Sciences
- Variables: Qualitative & Quantitative, Continuous & Discrete, Dependent & Independent
- Scales of Measurement: Nominal, Ordinal, Interval, Ratio
- Organization of data
- Types of class intervals: Inclusive, Exclusive & Open ended
- Frequency Distribution: Measures of Central Tendency – Arithmetic Mean, Median and Mode for un-grouped and grouped data
- Presentation of data: Bar diagram, Pie Diagram, Histogram, Frequency polygon, Frequency curve, and Line diagram.
- Measures of Variation: (Definition, computation, merits, demerits & application), Range, Inter Quartiles, Mean Deviation, Standard Deviation Co-efficient of Variation
- Partition values: Quartiles, Percentiles
- Probability: Definitions of Classical Probability (Priori) and Frequency, Probability (Posteriori), Addition and Multiplicative Theorems of Probability
- Normal Distribution: Concept, Normal curve, Properties, Skewness and Kurtosis
- Probability Distribution: Binomial distribution, Poisson distribution and Normal distribution
- Sampling- Definition: Population and simple Sampling, Simple Random Sampling, Stratified Random Sampling, Systematic Random Sampling and Cluster Sampling
- Correlation and Regression: Scatter Diagram, Linear Correlation and Linear Regression Equation Test of Significance – Procedure Test of Significance for large samples and for small samples, Properties of correlation coefficient, Examples
- Research Process and Research Methodology
- Chi-square Test – Testing for association Misuse of Chi-square Test

Hospital Statistics

- Definition of hospital statistics and important Hospital Terms

- Sources of Hospital Statistics –Registers, Medical Records and Daily Ward Census
- Analysis of Hospital Services and Discharges ¬ Important Rates, Ratio and Percentages with Formula
- Important Rates, Ratio and Percentages with Formula
- Uses and Limitations of Hospital Statistics
- Hospital Statistics Reporting

Vital Statistics

- Definition and Uses of Vital statistics
- Methods of Collection of Vital Statistics
- Formulae for processing Vital Statistics:
    - Crude Rates
    - Specific Rate
    - Prevalence, Incidence, Morbidity, fertility rates
    - Mortality Rates – Crude Death Rate, Specific Death Rates with respect to age , sex etc. Cause-of-death Rates; Infant Mortality Rates; Neonatal Mortality Rates
    - Post-Neonatal Mortality Rate or Late Infant Mortality Rate

Health Statistics

- Introduction
- Uses and Sources
- Collection of hospital statistical data: Birth, Death, fetal death, live birth and immature infants, reporting, determination of basic data, daily analysis of hospital service, discharge analysis procedure, cumulative method, monthly and annual reports, computation of percentage (ratios) inpatient census and bed occupancy rate (computerized and manual), presentation of hospital data.
- Criteria of ill health
- Classification of healthy and sick
- Measurement of morbidity

Research Methods:

- Research in medicine and health care
- Clinical research and clinical trials
- Health record data in research
- Research process
    - Defining the research question (problem)
    - Determining a research design and method
    - Data collection procedures
    - Data analysis
    - Presenting results

- o Publishing researcher
- o quality improvement and the use of aggregate data
- o The role of HIM professionals in quality improvement programs
- o Collecting data through questionnaire and Record forms, Methods of collecting data, literature review and steps in research methods Presentation of Data – Bar Diagram; Pie Diagram; Histogram; Frequency, Polygon, Frequency Curve; Cumulative Frequency Curve and Line Diagram.

HIM PRACTICUM I

This first professional practice experience utilizes the applied areas of health information management (hospital facilities). Students will be exposed to a variety of health information management (HIM) applications such as Master Patient Index (MPI). HIM tasks include abstracting, chart tracking, document imaging, and deficiency analysis, release of information, patient registration, transcription and functions of MRD. Students will submit reports after each areas of posting.

Third Semester

Health Information Management – I
XI. Characteristics of quality Medical Records:
- Definition, Characteristics of 'Good' Medical Record
- Values of 'Good' Medical Record to various users
- Required Characteristics of entries in medical Records
- Source-oriented, Problem-oriented, and Integrated medical records
- Medical Record Forms and their Content
- Standard Order of Arrangement of Medical Record forms
- Analysis of Medical Record-Quantitative & Qualitative
- Incomplete Record Control

XII. Medical Records for different patient encounters with health care facility
- Ambulatory Care Records {Emergency & Outpatient Records]
- Clinical Records in Long Term Care and Rehabilitation Facilities
- Mental Health Records

XIII. Filing Methods, Storage, and Retention
- Numbering and Filing Systems
- Filing
- Storage- Microfilming and Disk Storage
- Retention
- Registers & Indexes
- Record movement control & Tracking system

XIV. Organizational Aspects of Medical Record Department/Services
- Policies

- Functions
- Location, Space and Layout
- Equipment
- Forms Designing and Control
- Medical Records Flow and Processing

XV. Organizational Aspects of the Centralized Admitting Services
- Principles of Identification of a Patient
- Methods of Collection of Identification Data
- Types of Central Admitting Services
- Admitting Policies
- Procedure Outlines for Admissions
- Flow of Records following Admissions
- Advantages of good Admitting Policies and Procedures
- Pre-requisites for smooth & efficient functioning of the Centralized Admitting Services

XVI. Medical Record Department Management
- Planning, Organizing, Directing and Controlling
- Personnel
- Principal Responsibilities and Duties of the Medical Record Administrator/Director
- Tools of Management in the Hands of the Medical Record Administrator/Director

XVII. Intradepartmental and Interdepartmental Relationships
- Developing Intradepartmental Relationship
- Developing Interdepartmental Relationships with various Departments of the Hospital

XVIII. Quality Management
- External and Internal Pressures for quality
- Quality Assessment and Quality Improvement
- Quality Assurance & Medical Care Evaluation
- Utilization management
- Peer Review
- Utilization review processing & outcomes of Utilization management
- Risk management program [Organization & Operation
- International Standards Organization [ISO], Quality Council of India, & National Accreditation Board of Hospitals [NABH]

XIX. Heath Care Statistics, Quality control of Data Collection & Presentation
- Incomplete Record Control
- Inpatient census and rates computed from it.
- Ambulatory care statistics
- Long term Care Statistics
- Processing and reporting of Reproductive Health Statistics
- Reporting of Notifiable Diseases to Public Health Authorities

XX. Nomenclatures and Classification Systems:

- Standard Nomenclatures of diseases (SNDO)
- Current Medical Information Terminology
- Systematized Nomenclature of Pathology (SNOP)
- Systematized Nomenclature of Medicine (SNOMED)
- Common Procedures Coding System (HCPCS)
- Current Procedural Terminology
- International Classification of Functioning, Disability and Health (ICF)
- Case-Mix Classifications
- Diagnosis Related Groups
- ICD – 9 (CM)
- ICD – 10
- ICD- Oncology (ICD - O)

XXI. Medico-Legal Aspects of Health Information Management
- Medical Ethics, Hippocratic Oath, and Code of Ethics for the Medical Record Professionals
- Ownership of the Medical Record
- Privileged Communication and confidentiality of Medical Records
- Release of Information: To the Patient, To Authorized Persons /Agencies Legal Implications of release of Information to unauthorized, Persons/Agencies.
- Consents: Different types and their validity, invalidity blanket, and improper consents.
- Corrections in identification data medical documentations
- Rights and responsibilities of patients
- Medical Record in a Court of Law
- Legal requirements in Retention of Medical Records

Information Technology

Hospitals are highly complex institutions, with thousands of individuals sharing responsibility for the care and services provided to patients. Since medical interventions have expanded exponentially over the past several decades and average length of stay in hospitals has dropped sharply, patients now receive an enormously complex array of services in a much shorter period of time. Effective care and the survival of patients require the management of large amounts of information over a relatively short period of time. Failure to communicate or accurately record information in a timely manner can easily cost the life of a patient. In addition, growing pressures to constrain health care costs have put great pressure on hospitals to be more efficient as well as effective. The survival of a hospital requires the effective management of large amounts of information.

The hospital of the twenty-first century cannot survive without effective information technology. Relatively quickly, information systems and technology have become integral components of health care delivery systems.

Learning Objectives: Medical informatics, may defined as the art and science of processing medical information.

Computer Applications and Technologies in Healthcare

This section provides an overview of healthcare information systems with a concentration on computerized health information management (HIM) functions. Students will be introduced to common software applications utilized to perform HIM processes. Emerging technology issues in healthcare will be explored.

Office Applications

This section focuses on the concepts and operation of the main components of word processor, electronic spreadsheet, database management, and presentation software programs. Students will gain fundamental knowledge of a major software suite and learn skills that have practical application in real world situations.

Database Management System (Practical)

This subject discusses the design, development, deployment, and evaluation of database systems. In addition, students learn conceptual and relational data modeling, and implementation languages. Additional topics include data integrity, relational normalization theory, security, privacy, and concurrence control.

Basic ICD-10, ICD-9CM Coding

This section is designed to introduce the student to medical nomenclature and classification systems. Emphasis will be placed on ICD-9-CM structure, conventions, and guidelines for coding in hospitals and physicians offices.

On completion of this programme, trainees will have knowledge of accessing and processing biomedical and clinical information, basic principles of patient and hospital data base management (expertise in computing, communications, and content)

7. The Internet
- Define the Internet
- How the Internet works
- Internet capabilities and limitations
- How to connect to the Internet via modem ISDN, etc.
- Navigate the World Wide Web
- Identify services and tools offered on the Internet
- Use services and tools offered on the Internet
- Explain book marks
- Safety

8. Email
- Define electronic mail
- Compose electronic messages
- Send electronic messages using appropriate format
- Transmit document using electronic mail system

9. Basic knowledge of networks
- Explain communications standards
- Describe network structures
- Explain network types and protocols
- Explain network connectivity
- Explain the function of servers in a graphic network
- Describe various network operating systems
- Explain the difference between network software and individual use software
- Use a network to access, file, and store files

10. Information processing activities
- Key, process, print and store text and data information using integrated software
- Troubleshoot basic computer malfunctions
- Load media devices
- Set up print devices
- Operate scanner devices
- Operate Print devices
- Maintain print devices
- Monitor peripheral equipment operations

11. Operating Systems
- Identify operating systems and their attributes (i.e., DOS, Unix, Macintosh, Windows)
- Identify the advantages and disadvantages of the computer to individuals and business.
- Identify the roles and equipment used for input, processing, and output in an information system.
- Identify correct safety procedures

12. Demonstrate basic computer literacy
- Create directories/folders and sub-directories
- Format disks
- Manipulate files (copy, rename, delete)
- Keyboard proficiently by touch

13. Computer File Manipulation
b) General
- Create data directory and subdirectories/folders and place files in subdirectories/folder. Copy, rename, move and delete files. Copy a disk.
- Make backup disks/files of a data directory or
- Subdirectory/folder and delete data from backup disks/files

c) Personal computer systems
- Monitor system status and performance
- Run diagnostics
- Report computer system malfunction(s)
- Report software malfunction(s)
- Maintain security
- Perform backup procedure(s)
- Perform preventive maintenance
- Follow log-off and power-down procedure(s)
- Follow equipment maintenance procedures
- Follow quality control procedures

d) Maintain computer security requirements
- Follow security rules, regulations, and codes
- Implement security procedures

e) Software applications
- Define software types and functions

- Describe need for application software
- Describe different types of software applications
- Explain advantages and disadvantages of integrated and dedicated software
- Explain software copyright laws
- Explain data compression techniques
- Explain use of passwords/security
- Utilize desktop productivity tools

f) Operation of peripheral devices
- Identify peripherals and operating requirements of each
- Explain purpose of input devices (e.g., keyboard, mouse, scanners, pens, bar code readers, credit/debit/smart cards, voice, video, gloves)
- Describe operation of output devices (e.g. voice, speaker output devices, printers, plotters, printer sharing units, SCSI interface, video display)
- Describe operation of multimedia (video, audio sound)

g) Information Processing Cycle
- Describe difference between data files and program files

14. Database
- Define database
- Explain terms used in database systems
- Describe common functions of database systems
- Use database to create, input, edit, and display fields and records
- Analyze structure of database file
- Perform calculations with a data base file
- Alter structure of database file
- Sort records based on multiple fields
- Identify advanced database technology
- Use appropriate reference materials
- Utilize relational database
- Enter elements into database
- Proofread database
- Explain database
- Design report formats
- Transfer data to and from remote database
- Print reports using data from multiple databases
- Use database files with other application software
- Verify accuracy of output (e.g., edit reports)

15. Basic Data Processing
- Input, update and store data into records in an existing database
- Open stored spreadsheet, input and update data into spreadsheet, store revised spreadsheet and print revised spreadsheet

16. Database and Spreadsheet Operations
- Plan and create database, input and update data into records, store database and print quick reports from database.

- Create spreadsheet, input data into spreadsheet, update data in spreadsheet and store spreadsheet.

17. Introduction to Spread sheet packages

18. Introduction to Word Processing packages
- Document processing
- Key, print and store merge documents (form letters, mailing labels and envelopes)
- Scan documents onto a formatted storage medium and import into a word processing program
- Locate and retrieve information from a variety of electronic sources
- Prepare, place and send information on the internet
- Key, Print and store transparency masters for presentation from legible longhand or edited rough draft using presentation software.

19. Basic Computer Concepts and Applications
- Explain how data is stored in main computer memory
- Explain how computer system executes program instruction
- Explain computer storage capacity
- Explain how data is represented
- Describe data storage devices
- Identify types of memory
- Describe back-up and archival disciplines
- Merge a database application and a spreadsheet application with a word processing document.
- Use available software to input personal, business, and organizational names in proper indexing order, and produce an alphabetical list.
- Integrate database, spreadsheet and graphic files
- Convert documents from one system to another
- Demonstrate use of computer thesaurus
- Use multimedia techniques/resources
- Perform merge functions

20. Hospital Information System (HIS) with Electronic Medical Records (EMR) or Electronic Health Information Management System (HMIS)

Fundamentals of Management
Introduction to Management
- Importance of Management
- Definition of Management
- Characteristic features of Management
- Roles of Management
- Role of a Manager
- Levels of Management and their functions
- Process of Management

- Managerial skills
- Management and Administration Management – Science or an Art? Management – a profession?

Principles of Management
- Meaning of principle
- Nature of Management principles
- Need for Management principles
- Early Management approaches
- Scientific Management
- Administrative Management
- Human Relation Movement
- Modern Management approaches
- Behavioral approach
- Quantitative approach
- System approach
- Contingency approach

Coordination
- Distinction between coordination and cooperation
- Need for coordination
- Requisites for excellent coordination
- Types & Techniques of coordination
- Difficulty of coordination

Planning
- Nature of Planning
- Importance of Planning
- Forms of Planning
- Types of Plans
- Steps in Planning
- Limitations of Planning
- Making planning effective

Decision Making
- Meaning
- Types of decisions
- Steps in Rational decision-making
- Difficulties in decision-making

Organization

- Meaning
- Why study organizations?
- Process of organizing
- Span of Management
- Principles of organizing
- Departmentalization

Communication
- Importance of communication
- Purposes of communication
- Formal communication
- Forms of communication
- Informal communication
- The communication process
- Barriers to communication
- Principles of effective communication
- Communication networks in a working group
- Checks on in-plant communication
- Communication in Indian industries

Staffing
- Importance and need for proper staffing
- Manpower planning
- Recruitment
- Selection
- Placement and orientation

Training and Development
- Meaning
- Advantages
- Types of training programmes
- Training methods

Performance Appraisal
- Purposes
- Essentials of a good performance appraisal system
- Criteria for performance appraisal
- Performance Appraisal methods

Promotions
- Meaning

- Requirements of a sound promotion policy
- Merit vs Seniority
- Designing a seniority system

Directing
- Definition
- Requirements of effective direction
- Giving orders

Motivation
- Meaning, definition
- Nature and characteristics of motivation
- Importance and benefits
- Types of motivation
- Various theories
    - McGregor's
    - Maslow's
    - Herzberg's
- Wage Incentive Plan

Counseling
- Definition
- Characteristics
- Need & Causes
- Functions, Types & Steps in counseling process
- Drawbacks of counseling

Mentoring
- Meaning, Role of a mentor
- Importance, Steps
- Conditions necessary for effective mentoring system
- Types
- Hurdles

Leadership
- Meaning
- Role of a leader
- Leadership theories

Professional Practice in Health Information Management

Modern Healthcare team

- Functions and Roles
- Professional Image
- Inter and Intra personal relations
- What employers look for

Professional Issues
- Dichotomy
- Professionalism at all levels
- Productivity and compensation
- Quality Assessment
- Understanding Occupational health and safety

Communication
- Effective Communication
- Networking
- Team Building
- Risk Management

Technology
- Tools of the trade
- Recent advances

Time and Stress Management
- Time Management in Health Information Profession
- Stress Management for enhancing productivity
- Motivational techniques
- Morale boosting

HIM Practicum – 2

This second professional practice experience takes place in a health information management department of an acute healthcare facility. Students are supervised by a qualified personnel assigned by the healthcare facility, and are provided with practical experiences that ground the theories acquired in prior coursework. The PPE focuses on departmental functions, quality assessment and performance improvement, computerized information systems, organizational resources and management, billing and reimbursement, document imaging, and the electronic health record.

Fourth Semester

Health Information Management II & Nomenclature:

Health Information Management serves the healthcare industry and the public by managing, analyzing, and utilizing the data vital for patient care and making the data accessible to healthcare providers. Enhancing individual patient care through timely and relevant information is one of the primary goals for the Health Information Management Technology.

Informatics and Health Information Management

Introduction, Health care delivery systems, Informatics in Health Care, Health Information Management profession, Data and formation management, Information systems Development

Aggregate Health care data

Secondary records and Health care database, Clinical classification and Terminologies, Reimbursement methodologies

Nomenclature
- Introduction to Nomenclature
- Early Nomenclature
- Specialty Nomenclature
- Statistical Classifications
- Other Classifications
- Choosing a Classification System
- Encoding Systems
- Summary

Organizational Development and Planning in Health Information Management

This subject introduces strategic planning and organizational development. The interplay of strategic leadership, management, and planning will be applied to health information management. Other topics include organizational assessment and benchmarking, change management, and leading enterprise-level projects.

The list of topics to be covered are:

- Knowledge of leadership, management, organizational structures theory
- Knowledge of accreditation requirements, licensing regulations, and certification requirements relevant to department/organization
- Knowledge of financial management and budgeting
- Strategy development
- Policy development
- Ability to create agendas, lead meetings, maintain documentation, and follow up
- Effective communication and negotiation skills
- Conduct a stakeholder analysis

Electronic Health Records

This subject explores the development of electronic health records (EHRs) and health informatics. Students will analyze the technical components of EHRs including laboratory information systems, pharmacy information systems, picture archiving and communication systems, order sets, clinical protocols, provider orders, medication administration records, point-of-care charts, and clinical decision support systems. The benefits and barriers of implementing electronic health records will be discussed. The course will also cover personal health records, network architectures, and connectivity.

The list of topics to be covered are:

- EHR – definitions – contents and examples of EHR practices
- Preliminary steps in implementation of EHR
- Issues and challenges in implementation of EHR
- Planning for the introduction of EHR
- Factors to be considered when developing EHR & implementation plan
- Implementation plan

Quality Assurance in healthcare

Subject covers diverse perspectives in quality management and regulation including relevant research and management methodologies of quality, cost and access to healthcare with a focus on the role of health information management. Overview of performance improvement, methods and applications in the area of outcomes research including practice variation, risk adjustment, quality measures and quality management (or quality improvement), practice guidelines, evidence-based medicine, clinical decision support, health-related quality of life, utility assessment, economic evaluations (including cost- effectiveness studies).

Healthcare financing

- National health spending
- Paying for healthcare
- Basics of Health Insurance
- Different types of healthcare financing in India

Health insurance

- Terminologies
- Functions of a health financing system
- What is health insurance?
- History of health insurance
- Values in health insurance
    - Solidarity
    - Risk pooling / sharing
    - Equity
- Participation / empowerment
- The health insurance framework
    - Community
    - Providers
    - Organizer
    - Insurer
- Premium
    - Benefit package
    - Payments
    - Administration
    - Risk management
    - Monitoring the programme

- Types of health insurance
  - Social health insurance
  - Private health insurance
  - Community health insurance (CHI)
  - Government-initiated health insurance schemes (GHI)
  - Differences in the four categories
- Advantages of health insurance
- Problems with health insurance
  - Adverse selection
  - Moral hazard
  - Cost escalation
  - Administrative costs
  - Fraud
- Health insurance in India
  - Social Health insurance
  - Voluntary (commercial) health insurance
  - Daily hospitalization expenses – Royal Sundaram's Hospital Cash
  - Critical illness cover – ICICI Prudential's Crisis cover
  - Community health insurance (CHI)
  - Government-initiated health insurance schemes

Fifth Semester

Fundamentals of Health Informatics & Data Security

The subject reviews the structure of clinical data and e-health records, and the required standards and regulations for documentation. Health information benchmarks include conceptual, documentation, messaging, and application standards. Students will learn about security issues for reimbursement and prospective payment systems, analytical methods for identifying trends, and presentation techniques for healthcare decision-making.

Introduction to health informatics:
Definition, Domain, Sub-domain, Tools, Focus, Application, subject area, Aspects, & Functions
Major theories such as System Theory, Information Theory, Learning Theory and Change Theory
Health Informatics Literacy: Information, computer and professional literacy.

Health Information System:
Definition, Purposes, Structure (operation, telecommunication, system development / project management, application support, support, network, system administration), Roles and responsibilities (CIO, Director, Manager, Supervisor, Operator, Telecommunication technician, Telecommunication Operator, System Analyst, Programmer, Consultant), Technology infrastructure (Computers, Networks, Peripherals)

Standards in Health Informatics
Standard Coordinating Group, Group formed to developed standard, Professional Organization Supporting the Development of Technical Standards, Establishing International Standards,

International Standard & Committee, International Standard, Identifier Standard, General Communication Standards, Specific Communication Standards, Content and Structure Standards, Clinical Data Representation, Standard for Software Application, Telecommunication Standard.

Introduction to Health Informatics Applications
Hospital Information System, Clinical Decision Support System, eHealth, mHealth, Telemedicine

Impact of healthcare informatics on the socio-culture environment of healthcare
Information Needs and Challenges in Healthcare Environment, Advances In Healthcare Informatics In Clinical Area, Changes In Professional Practice due to advances in healthcare informatics, Changes In Management Roles due to advances in healthcare informatics

Future Direction in Health Informatics
Nine trends to predict the development of healthcare informatics, Future Study, Approach for predicting, Trends influencing healthcare informatics, Case Studies

International Classification of Diseases (ICD-10) and Surgical Procedures (ICD-9CM), CPT, HCPCS & SNOMED-CT:
- Coding of final diagnosis and secondary diagnosis.
- Disease and operation nomenclatures, International Classification of Disease 10, International Classification of Disease – 9CM indexing of patient care data.
- Introduction and usage of International Classification of Disease in practicals
- International Classification of Diseases
- ICD-10, ICD-9 CM (Surgical Procedures)
- CPT – Current Procedural Terminology (Introduction)
- HCPCS – Healthcare Common Procedure Coding System (Introduction)
- ICD-10 - Alpha-numeric coding
- Volume 1 – Tabular list
- Volume 2 – Instruction manual
- Volume 3 – Alphabetical Index
- Classification of Diseases according to Clinical Pertinence
- ICD-9CM (Procedure) coding – International Classification of Diseases – Clinical modification
- CPT – Introduction of CPT and HCPCS – 3 levels of codes
- SNOMED-CT

Hospital Organizations and Administration and Medical Ethics and Consumer Protection Act:
Hospital Organization and Administration

1. Introduction to Hospital Administration
   a) Who's Who in hospital – Key administrators and their functions, overview of medical and para-medical specialties, main service departments:

b) Overview of health services – government services: private & not for profit: primary, secondary & tertiary health care: types of hospital: community, super-specialty etc.

2. Principles of Organizational Management
   a) Culture, Values and Mission
   b) Organizational Structure
   c) Planning and Controlling
   d) Hospital Organizational Structures – Government, Private and Not for Profit.

3. Managing People (Human Resources)
   a) Overview – scope and functions of HR dept., HR planning
   b) Recruitment and Appointment
   c) Training and Development
   d) Goal setting, rewards systems and motivation
   e) Performance Appraisal
   f) Promotion, internal transfers
   g) Problems and Legal issues
   h) Leadership
   i) Working in teams

4. Clinical Services
   a) Overview of clinical departments and services – OPD, In-patients, ICU, Surgical, Emergency, Community/family Health, Paramedical & Rehabilitation
   b) Types of doctors, their training, roles and responsibilities
   c) The role & responsibilities of the HOD
   d) Medical Audit
   e) Medical Negligence & Litigation

5. Nursing Services and Wards
   a) Objectives of the nursing service
   b) Nursing service organization, types of nurses, their training, qualifications and functions, other ward staff, personnel issues.
   c) Ward management

6. Product-based services
   a) Pharmacy purchasing and stores
   b) Pharmacy dispensing
   c) Pharmacy Inventory management and drug formulary.
   d) Prosthetics & Orthotics

7. Diagnostic Services (Radiology, Laboratories, Blood Bank etc.)
   a) Overview – main services and their functions
   b) In-house services

8. Patient Services (non-medical)
   a) Reception, Welcome/Help Desk
   b) Patient facilities, wheelchairs, Ambulances
   c) Public Relations – objectives, functions, policies, different media, methodologies, networking

9. Managing Support Services

a) Overview of functions of all support services including Laundry, Catering, Cleaning, CSSD, Transport, Security, Materials (Purchase and Stores) etc.
   b) Functions of GS Office
10. Hospital Infrastructure (Buildings and Plant)
   a) Civil Engineering – Planning and maintaining buildings, water & sewage
   b) Electrical Engineering
   c) Mechanical Engineering, Equipment Maintenance, Medical Gases, etc.
   d) Biomedical Engineering

11. Hospital Information Systems
   a) Analysing information requirements
   b) Reporting systems
   c) Early warning systems
   d) Computerized Systems, intranet
12. Managing the Organization (putting it all together)
   a) Planning: strategy and corporate planning
   b) Dealing with risk and uncertainty
   c) Organizational Development and Change management
   d) Corporate Governance & legal matters
   e) Relationships with other institutions and organizations

Medical Ethics & Consumer Protection Act

This course is designed to provide Medical Record professionals, an advanced knowledge of structure of Indian Judicial system, Basics of Medical laws, Matters relating to Medical Negligence, Medical Ethics and Consumer Protection Act.

This course will equip students with general skills needed in guiding medical professionals to follow required standards of medical documentations to protect the welfare of the health care institution and the patients.

Laws relating to Hospital Administration:

1. Structure of Indian Judicial System:
   Subordinate courts - Various Tribunals - High court and Supreme court - their working relationships and effect of orders
2. Medico – legal cases:
   IPC – Medical Termination of Pregnancy Act 1971, Transplantation of Human Organs Act.
3. Law of Contract:
   Patient as a consumer - Law of Tort - Composition of D.C.D.R.F, S.C.D.R.C and N.C.D.R.C - powers, terms and jurisdiction, enforcement of orders.
4. Medical Negligence:
   Negligence - Medical Negligence - Contributory Negligence - Gross Negligence - Criminal Negligence - Onus of Proof - Prevention of such Negligence.
5. Liability and Compensation:

Vicarious Liability - Liability of Medical Professionals and Para-medical staff - Quantum of Compensation - Applicability of provisions of Consumer Protection Act for various institutions.

6. **Consumer Protection Act 1986:**
   Various provisions - structure, powers and jurisdiction of various forums constituted in C.P Act - orders - how enforced.

7. **Consent:**
   Consent - Medical Consent - various types of Consent - Consent forms - "informed Consent" in clinical trials - Consent as a process - full proof methods for proper Consent - various defects in obtaining Consent.

8. **Important case studies:**
   District Forums, State Consumer Disputes Redressal Commission - National Consumer Disputes Redressal Commission Case study as how cases were decided.

9. **Medical Council of India:**
   The medical council Act – Rules and regulations pertaining to management and functioning of medical records department, management of patient information and generation of various hospital statistics.

Healthcare Policies & Standards

- Knowledge of applicable health law, regulations, accreditations standards, and certification requirements.
- Ability to evaluate compliance and develop compliant organisational policy
- Implement compliance auditing methods and techniques
- Implement ICT systems in compliance with applicable laws, regulations, standards and requirements

Human Resource Management

This subject introduces the principles of managing people and other organizational resources. Students will learn how to plan, organize, lead, and evaluate human resources. Topics include: management and leadership, motivations, team building, communication, productivity, performance appraisal, recruitment, job development, training, performance improvement, and revenue cycles.

Topics to be covered include:

Understand staffing levels and productivity standards

- Performa productivity calculations
- Knowledge of labor/employment laws
- Awareness of human resources structure and operations
- Principles of human resources management
- Able to apply techniques/practices related to recruitment, supervision, retention, counseling, disciplinary action
- Knowledge of employment laws, labor laws (local and national)
- Plan workforce education and training programs
- Monitor relevant labor trends and market analysis
- Monitor and benchmark performance standards
- Plan professional development for self and others

Procedure coding system/s (ICPM, CPT, PCS)

This subject is designed to provide more in depth study of procedural coding using the International Classification of Procedures in Medicine (ICPM), Current Procedural Terminology (CPT) and ICD 9 CM Procedure Coding System.

Sixth Semester

Hospital Accounting and Financial Accounting, Health Insurance and Billing Design:

The course aims to give a fair view of exposure to the students on the basic concepts of accounts, Finance and Financial Management in Hospital and practical application in Hospital Financial Management Accounting and Health Insurance.

1. The Nature and purpose of Accounting, Accounting Concepts & Accounting records:
    a. What is accounting information? Who needs it? What they need or expect?
    b. What do accountants do?
    c. Single Entry Book – keeping
    d. Double Entry Book - keeping
    e. What is an Account? Making entries.
    f. Five types of Accounts (Income, Expense, Asset, Liability, Capital)
    g. Book – keeping rules
    h. Accounting books/ledgers (Nominal, Purchase, Sales, Journal etc)
    i. Dealing with cash, imprest system

2. Preparation of various Financial Statements:
    a. Trial Balance
    b. Receipts and Payments
    c. Income and Expenditure Account
    d. Balance Sheet

3. Fixed assets and Depreciation:
    a. What are fixed assets and why are they different?
    b. What is depreciation and why do we need it?
    c. How do we calculate depreciation? (pros and cons of different methods)
    d. Accounting entries for depreciation

4. Costing and Pricing:
    a. Financial accounting Vs. Cost accounting
    b. Key terms: Direct/indirect, fixed/variable/semi-variable
    c. Analysing results: Standard/budgeted/actual
    d. Costing hospital services
    e. Taken action: controllable /uncontrollable
    f. Making decisions: Marginal/book/out –of pocket costs
    g. Reporting costs: Cost Centres, allocation and apportionment of costs
    h. Pricing methods and decisions.

5. Inventory Accounting:
    a. Inventory / stocks
        *   Valuation (FIFO, LIFO, WAC etc)

- Optimum balance and reorder levels.

6. Analysis of Financial Statements:
    a. Ratio analysis – meaning and purposes
    b. Ratios applicable to Non-profit making organizations

7. Financial Planning and Control:
    a. Budgets and budgetary control

8. Use of Computers in Accounting:
    a. Computerized ledger systems
    b. Spreadsheets & Excel based accounting

9. Accounting and Audit Procedures in Health Care Sector:
    a. Accounting System in hospital
    b. Purpose of an audit and auditing principles
    c. What the auditor does?
    d. The audit report – "True and Fair View"
    e. Legal requirements: layout, audit and filing of accounts

10. Health Insurance and Third Party Payers
    a. Definition and history of Health Insurance
    b. Concepts in Health Insurance
    c. Issues in Health Insurance
    d. Effective Health Insurance
    e. Good & Bad in Health Insurance
    f. Reasons for lack of coverage
    g. Denial of claims
    h. Contracts or Memorandums of Understanding
    i. Health Insurance in India
    j. Health Insurance & Third Party Administrators
    k. Insurance Regulatory Development Authority & its role
    l. Billing & Health Insurance Billing

Health Information Management II, Medical Transcription and Telemedicine:

Health Information Management serves the healthcare industry and the public by managing, analyzing, and utilizing the data vital for patient care and making the data accessible to healthcare providers. Enhancing individual patient care through timely and relevant information is one of the primary goals for the Health Information Management Technology.

1. Development of Health Care Information
    - Health Care Information standards, Paper based Health Records, Computer based patient records, Ethical issues in Health Information Management
2. Comparative data
    - Research methods, Clinical quality management
3. Management of Health Information Services
    - Principles of Management and Leadership, Work Design and Performance improved, Human Resources Management, Training and Development, Project Management, Strategic Management.
4. Medical Transcription:
    - Basics of Medical Transcription

- Objectives of Medical Transcription
- Rules of Medical Transcription
- Advantages of Medical Transcription
- Division of medical words into their component parts
- Forms, Suffixes, Prefixes and Terminology
- Laboratory tests, Clinical procedures and Abbreviations

5. Telemedicine:
   - Basic health care
   - Classification of Telemedicine
   - Technology of Telemedicine
   - Objectives of Telemedicine
   - Rules of Telemedicine
   - Telemedicine Act
   - Merits of Telemedicine
   - Future Telemedicine plans
   - Research

Medical Transcription – (Practical)

This subject provides the in depth knowledge of Medical Transcription. A medical transcriptionist transcribes physician dictated medical reports, usually onto computer files for patients' charts for a healthcare system. They need to know the proper medical terminology, correct grammar usage, knowledge of common diseases, tests, procedures and medications. Knowledge and understanding of the body systems is very helpful. The transcriptionist needs to be familiar with the proper formatting of the different medical reports.

Application of HIM in Non-traditional Settings

The subject covers reimbursement, coding, licensing, and accreditation issues in these facilities:
- Management of health information in non-acute hospital settings
- Ambulatory care, mental health
- Home health, skilled nursing
- Emergency medical services and veterinary care

Seventh and Eighth Semester

Internship/Externship:

The internship/externship will span 12 months/ 2 semesters and will comprise of 2000 hours. A candidate must carry out an externship of minimum 3 months duration.

Skills-based outcomes and monitorable indicators for Health Information Management Technologist

S. No.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
1	Verify that documentation in the health record supports the diagnosis and reflects the patient's progress, clinical findings, and discharge status	Basic health record forms Completeness of health records Assembling and deficiency checking	Be able to verify the completeness and accuracy of the health record in terms of diagnosis and progress	100
2	Interpretation of health information standards	Current health information standards applicable in India	Demonstrates the ability to interpret and follow health standards applicable in India	100
3	Evaluate the accuracy of morbidity, mortality and procedural coding	ICD classification system	Demonstrates the ability to evaluate the completed coding for its accuracy on various accounts	200
4	Analyze health information needs of stakeholders across the healthcare organization	Basic data generated from Health records and its purpose and uses	Demonstrates the ability to view data collected in terms of a bigger picture	300
5	Manage clinical indices/databases/registries	Various indexes and registers.	Demonstrates the ability to manage the database of records	200
6	Evaluate health care data to create meaningful presentations	Minimum entry requirements in the health records	Demonstrates the ability to analyze and create presentations	200
7	Analyze legal concepts and principles to the practice of HIM	Confidentiality and privacy aspects of health records	Is able to follow legal requirements as needed	200
8	Utilize appropriate technology for data collection, storage, analysis, and reporting of health information	Basic hospital statistics calculation and data requirements	Is able to harness technology as needed to manage the health records	300
9	Apply data extraction methodologies	Purpose of data abstraction from health records	Is able to extract data, as necessary	200
10	Contribute in the development of operational policies and procedures for health information exchange	Principles of health information exchange, interoperability. Different types of health Information Systems and its uses.	Demonstrates the ability to see the overall picture and develop plans of operationalization	350
11	Identify the threats to data integrity and validity	Confidentiality and privacy acts and its legal implications	Demonstrates the ability to anticipate and ward off the threats to maintaining data integrity	350
12	Manage health information for reimbursement purpose	Health Insurance and TPA's requirements.	Is able to extract data for reimbursement purposes, as needed	200
	TOTAL			**2700**

4.3 Master of Science in Health Information Management (M.Sc. HIM)

M. Sc. in Health Information Management

Introduction:

Health information management is a combination of business, science, and information technology. These professionals are managers: experts in processing, analyzing and reporting information vital to the health care industry, respected staff members who interact daily with the clinical and administrative staff, all of whom depend on health information to perform their jobs.

A blend of business and computer expertise, health information management links health care clinicians with information technology and is the bridge between patients' health information and health insurers, state and central government, and other regulating agencies.

Expectation of future postgraduates in supporting future healthcare

HIM professionals do not just work in hospitals. They work for accounting firms, insurance companies, information systems vendors, government agencies, pharmaceutical research companies, and others. Wide varieties of employers actively recruit health information managers. According to the department of labor, employment opportunities for Health Information Management (HIM) professionals continue to grow much faster that the average for all occupations. They may look for career choices not only in acute-care settings, but in all types of alternative care settings, as well as in education, business, and legal settings. Services provided in these areas range from technical to administrative, with emphasis being placed on the latter. As a vital member of the health care team, the health information manager is responsible for managing health information systems. This professional plans and develops health information systems that meet standards of accrediting and regulatory agencies. They also design health information systems appropriate for various sizes and types of health care facilities. A postgraduate serves as an advocate for privacy and confidentiality of health information and plans and offers in- service educational programs for health care personnel. There are multiple job opportunities available to HIM graduates. The following is just a sample of jobs in various practice settings:

Traditional Settings	
Management, HIM (Medical Records)	Responsible for the day-to-day operations of an HIM Department, maintains a budget, oversees staff, and interacts with other hospital departments, plans for the department.
Tumor registry	Reviews, abstracts, and codes clinical cancer information in order to comply with government regulations. Maintains a database. Also
Coding	Reviews medical documentation and assigns appropriate diagnosis
Trauma registry (E.R.)	Collects, codes, and maintains data unique to trauma registry, maintains a database. Assists with research projects, performance improvement, and administrative planning.
Transcription	Responsible for providing accurate and timely reports for patient care, documentation and billing.
Quality Improvement	Collect and summarize performance data, identify opportunities for improvement, and present data to other clinicians and administrative staff.
Release of Information	Track, process, and evaluate requests for release of medical information. Requires knowledge of central and state laws & regulations.

Patient Admissions	Responsible for patient admission, insurance verification, database maintenance. Oversees a staff, maintains a budget, and communicates with other hospital departments.
Compliance Auditor	Responsible for conducting chart audits, preparing reports, and reporting data. Also, develops policies and procedures for staff training.
Physician Accreditation	Maintains databases with physician information in order to provide data to administrative staff for physician accreditation.
Utilization Review	Works closely with clinicians to analyze patient records in order to determine admission criteria and use of resources for length of stay. Must be knowledgeable of insurance requirements.
Physician offices	Manages day-to-day operations of a physician office, including scheduling, billing, staffing, budgeting, and record keeping, and reporting.
Risk Management	Collects, evaluates, and maintains data concerning patient injuries, claims, worker's compensation, etc. Reports data to administrative staff and makes changes to policies and procedures as needed.

Non-Traditional Settings	
Consulting firms	Works with various clients to provide HIM expertise.
Government agencies	Possible job opportunities involve working with state and central government agencies.
Law firms	Provide HIM expertise to areas within health law, central and state regulations concerning health care.
Insurance companies	Work with various providers in order to negotiate contracts, assist clients with claims.
Correctional facilities	Maintain health records, perform quality reviews and assist in research studies.
Extended care facilities	Maintain health records to provide a continuum of care, comply with central and state regulations, conduct quality reviews, and maintain accreditation requirements.
Pharmaceutical Research Statistician, Clinical Trials Coordinator, Data Manager	Provides data management services in order to meet customer needs. Manages projects, staff, and timelines.
Information Technology System Analyst Project Manager Data Manager	Works with software vendors to design clinical software, provides training to end-user staff, assists with system installations, provides system support.
Medical Software Companies Software Designer Software Tester	Designs and develops databases, performs various software testing, assists clients with system installations.

Eligibility for admission:

Pass in any undergraduate program of 3 years duration or equivalent with minimum aggregate of 50% marks in any science group. A candidate also must have passed in English (CORE or selective or functional) as a subject of studies in the qualifying examination

OR

Any health science graduate with MBBS/ BAMS/ BHMS/BDS/Nursing/Allied Health Sciences or equivalent with minimum aggregate of 50% marks.

<center>OR</center>

Provision for lateral entry

Lateral entry for BSc. HIM graduates with 50% of aggregate marks. They are eligible for lateral entry to second semester.

They have to complete their internship of 6 months to be eligible for lateral entry.

Selection procedure

Admission to MSc. H.I.M. (Health Information Management) course shall be made on the basis of eligibility and an entrance Test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.

Successful candidates on the basis of written Test will be called for the interview & shall have face an interview board. The interview board will include the Head of the Department of Health Information Management and Health of the Institution, whose recommendations shall be final for selection of students.

During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.

Candidate who fails to attend the Medical Examination on the notified date(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course will be struck off from the college rolls without giving any notice.

Duration of the course

The duration of certified study of the M.Sc. HIM course shall extend over a period of 2 (two) academic years/4 semesters (1150 hours of Theory and 530 hours of Practical Classes) and 900 hours of project work.

Total hours – 2580.

Medium of instruction:

English shall be the medium of instruction for all the subjects of study and for examination of the course.

Attendance

No candidate shall be permitted to appear for any one of the parts of MSc.HIM degree course examinations, unless he/ she has attended the course in the subject for the prescribed period in an affiliated Institution recognized by this University and produces the necessary certificate of study, attendance, satisfactory conduct and progress from the Head of the Institution.

A candidate is required to put in a minimum of 75% of attendance in both theory paper and 90% in practical separately in each subject before admission to the examination. This relaxation in attendance includes for medical & any other reasons approved by head of the Institution.

A candidate lacking in the prescribed attendance and progress in any one of the subjects in theory and practical shall not be permitted to the specific subject examination where shortage of attendance is recorded.

Assessment

Marks Qualifying for a Pass

A candidate shall be declared to have passed the examination if he or she obtains the following qualifying marks:

50% marks in the university examination and 50% marks in internal assessment evaluated by the department.

Practical examination and 50% aggregate in practical and 50% internal evaluation marks evaluated by the department.

Evaluation & Grading system criteria

Evaluation & grading **(Manual Relative grading)** of students shall be based on **GPA** (Grade point average) & **CGPA** (Cumulative grade point average).

Evaluation weightage

The final evaluation and grading for each subject shall be based on internal assessment components (50 percent weightage) and semester end examination (50 percent weightage) conducted by the University.

Weightage distribution

Item	Weightage (%)
Class participation/presentation	20%
Assignment & quizzes	10%
Sessional exams	20%
Semester end University exam	50%
Total	100%

Letter Grading System

Letter Grade	Credit value (Grade Value)
A+	10
A	9
B	8
C	7
D	6
E	5
F	0

Credit Details:

Lectures:	1 hour/week	= 1 Credit
Tutorials:	1 hour/week	= 1 Credit
Practical:	2 hours/week	= 1 Credit
Project:	30hours/week	= 1 Credit

Credit Includes: L – Lectures, T- Tutorials, P- Practical, and PR – Project.

Postgraduate Program Requirements- Credits

108 credits are required for the M. Sc. in Health Information Management course and 6 months of internship.

Model Curriculum Outline

First Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MHIM-001	Anatomy	50	0	50
MHIM-002	Physiology	50	0	50
MHIM-003	Pharmacology	50	0	50
MHIM-004	Fundamentals of Computer Applications	40	30	70
MHIM-005	Introduction to the Health Information Management Profession	40	0	40
MHIM-006	English & communication skills	40	10	50
MHIM-007	Medical Language I	80	20	100
MHIM-008	HIM Practicum I		140	140
	TOTAL	350	200	550

Second Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MHIM-009	Health Information Management	90	20	110
MHIM-010	Disease Classification Systems (pr)		100	100
MHIM-011	Quality Management in Health Services	50		50
MHIM-012	Database Management System	50	20	70
MHIM-013	Medical Language II	60	20	80
MHIM-014	Management & organizational behavior	30		30
MHIM-015	Biostatistics & Research Methodology	50	0	50
MHIM-016	HIM Practicum II		100	100
	TOTAL	330	260	590

Third Semester

Sl. No.	Course Titles	Hours		
		Theory	Practical	Total
MHIM-017	Healthcare financing (financial management, hos accounting, insurance, economics)	110	30	140
MHIM-018	Recent advances in health information management	40		40
MHIM-019	Hospital Administration	80	20	100
MHIM-020	Healthcare policies & standards	50		50
MHIM-021	Clinical Workflow & Process Redesigning	60	20	80
MHIM-022	Professional Ethics in HIM	50		50
MHIM-023	Health informatics	80		80
TOTAL		470	70	540

Fourth Semester

Applied Research Project: The project will span 6 months of 900 hours

First Semester

Anatomy
General Anatomy

- Anatomical Position and Anatomical terms
- Epithelium – Types and functions
- Connective tissue – fibres and cells
- Cartilage – type, structure and functions
- Bone – types, structure and blood supply
- Muscles – classification, structure and function
- Neuron – types and structure, typical spinal nerve
- Blood vessels – arteries, vein lymph vessels, lymph nodes, structure of lymph node
- Joints – classification, examples, structure of a typical synovial joint
- Classification of synovial joint

Respiratory System
Nasal Cavity, Larynx, Trachea, Thoracic Cage, Diaphragm, pleura, lungs

Cardiovascular system
Mediastinum, Pericardium, heart, blood supply and nerve supply of heart, blood vessels in thorax, thoracic duct, major arteries and veins of head and neck, Major arteries and veins of abdomen and pelvis

Gastrointestinal system
Tongue, salivary glands, pharynx, esophagus, stomach, small intestine, large intestine, rectums and anal canal, Difference between jejunum and large intestine, difference between small and large intestine, liver, extra-hepatic biliary apparatus, pancreas

Urinary System

Kidney, Ureter, urinary bladder, urethra

Male Reproductive System

Testes, spermatic cord, vas deferens, prostate, seminal vesicles and ejaculatory duct

Female Reproductive System

Uterus, uterine tube, ovary

Endocrine Glands

Pituitary gland, thyroid gland, parathyroid gland, suprarenal gland

Nervous System:

Central Nervous System

Spinal cord, Brain, External feature of medulla oblongata, cerebellum, Attachment of cranial nerve to the brain stem, Mid-brain, Diencephalon, Corpus striatum, Cerebral hemispheres, fiber system of brain, blood supply of brain, ventricle, CSF production and circulation

Special Senses

- Gross anatomy of eye
- Gross anatomy of external, middle and internal ear
- Skin

Physiology

Basic concepts and Nerve physiology

- Transport across cell membrane: Passive transport- diffusion, facilitated diffusion, osmosis; Active transport-primary and secondary active transport
- Body fluids: Distribution of total body water, ionic composition of body fluids
- Neuron: Differences in structure and function of myelinated and unmyelinated nerve fibres
- Resting membrane potential and Action potential

Muscle physiology

- Muscle: Classification, characteristic features of skeletal, cardiac and smooth muscles
- Skeletal muscle: Structure, types of muscle fibers, neuromuscular transmission, excitation contraction coupling, rigor mortis
- Smooth muscle: Types

Blood

- Composition and functions of blood
- Plasma proteins and their functions
- Red Blood Cells: Erythropoiesis- Stages and regulation
- Hemoglobin: Normal values, variations and functions
- White Blood Cells: Types, normal values and functions
- Platelets: Normal range, functions, purpura
- Coagulation or clotting of blood: Clotting factors, Intrinsic and extrinsic mechanisms, hemophilia
- Anticoagulants: Classification and examples

- Blood groups: ABO and Rh systems, importance of blood grouping, hazards of blood transfusion, erythroblastosis fetalis
- Functions of lymph

Cardiovascular system
- Structure and innervation of heart and blood vessels
- Cardiac muscle: Properties, Cardiac cycle
- Heart sounds: Differences between first and second heart sounds
- Electrocardiogram (ECG): waves, intervals and uses
- Heart rate: Normal value, variations, regulation
- Cardiac output: Definition, normal value, variations and regulation: role of heart rate, stroke volume and myocardial contractility, muscular exercise and cardiac output
- Blood pressure: Definition, normal value, factors influencing BP, short-term regulation

Respiratory system
- Organization: air passages, lungs, respiratory membrane
- Mechanism of breathing: Inspiration, expiration, pulmonary ventilation, alveolar ventilation
- Graphical representation of pressure changes during respiration
- Spirogram
- Oxygen transport: Forms, oxygen dissociation curve
- Carbon dioxide transport: Forms of transport, mechanism
- Regulation of respiration: neural and chemical regulation Cyanosis, hypoxia-types, types of hypoxia in which cyanosis occurs Definitions of apnea, dyspnea, asphyxia

Special senses
- Vision: Cross-section of eye
- Functions of aqueous humor
- Visual pathway, visual filed defects
- Accommodation to near vision, light reflex, refractory errors of the eye
- Visual acuity
- Hearing: Structure and functions of external, middle and inner ear
- Mechanism of hearing
- Vestibular apparatus: Parts and functions
- Receptors for taste and smell sensations

Pharmacology
General Pharmacology
- Introduction
- Route of Drug Administration
- Pharmacokinetics
- Pharmacodynamics
- Drug Toxicity and Safety

Autonomic nervous system, including skeletal muscle relaxants
- Introduction to ANS

- Cholinergic drugs
- Anticholinergic drugs
- Neuromuscular blocking drugs
- Adrenergic drugs
- Adrenergic Receptor Antagonist

Central Nervous System
- Sedatives and Hypnotics
- Antiepileptic drugs
- Local anaesthetics
- General anaesthetics
- Opioids
- NSAIDs
- Psychopharmacology

Cardiovascular System
- Antihypertensives
- Antianginal drugs
- Congestive cardiac failure
- Hypolipidemics

Respiratory System
- Pharmacotherapy of cough
- Pharmacotherapy of Bronchial asthma

GIT
- Peptic ulcer
- Antiemetics
- Digitalis & related cardiac glycosides
- Laxatives and antidiarrhoeals

Chemotherapy
- General aspects
- Beta lactam antibiotics
- Cotrimoxazole
- Aminoglycosides
- Tetracyclines
- Macrolides
- Quinolones
- Antifungal agents
- Antiviral drugs
- Antitubercular drugs
- Antileprotic drugs
- Antimalarial drugs
- Antiamoebic drugs

- Antihelminthics
- Anticancer drugs

Hormones
- Corticosteroids
- Antidiabetic drugs
- Thyroid and antithyroid drugs

Special Topics
- Standard abbreviations and symbols used in prescription
- Sources of drug information – Pharmacopeias, non-official references, MIMS, medical journals, FDA – product information
- Drug nomenclature – Chemical, generic, official and trade name
- Prescription writing

Fundamentals of Computer

Basics of Information Technology Introduction to Information Technology Introduction to computers, Hardware, Software, Microsoft Windows, Windows Accessories, Control Panel, Multi – Tasking Features of Windows, Microsoft Word (Basics, Formatting, Tables, Page design, Mail merges and creating documents), MS-PowerPoint (Toolbars, Drawing Palette, Working with slides), MS-Excel (Introduction Cell formatting, Charts and graphic objects, , Database, Pivot table, Data validation, , Dynamic data range and Controls, , File protection, what if analysis and templates), Assignment/Revision, To design and develop various standardized formats of patient health records.

Introduction to the Health Information Management Profession

This subject introduces students to the health information management field and the opportunities available for students after graduation. In addition, the course takes an evolutionary view of health information systems. Topics include the systems utilized for HIM departmental functions, the content and types of health records, and the retention and storage of health information. Professional ethics are woven throughout the course and students will be exposed to current issues impacting the field.

English for Health Professionals and Communication skills

Intended for students who have no/little background in the English language, this course facilitates effective communication between patients and their healthcare providers (nurses, doctors, medical staff), through emphasis on basic, practical language needed to communicate with English-speaking patients and their families in various settings. Building basic language fluency at the same time as medical terminology with cultural competency woven throughout, students will learn to gather and share basic information like greetings, goodbyes, patient intake, discussion of symptoms, location of pain and injuries, body parts, numbers, time, doses, and units of measure. Focus is on learning and becoming comfortable with basic medical English phrases and medical English vocabulary.

Medical Language I
Introduction
- Origin of medical terms historical perspective
- Various uses and application of medical terms
- Purpose of learning medical terminology

Stem Words/Root
- Musculo-skeletal system
- Respiratory system
- Cardiovascular system
- Digestive system
- Endocrine system
- CNS system
- Urinary system
- Reproductive system
- Organs of special sense
- Integumentary system

Prefixes
- Definition
- Various Prefixes, meaning and example terms
- Pseudo Prefixes – meaning & Example terms

Suffixes
- Definition & Types of suffixes
- Various Suffixes, meaning and example terms

Surgical procedures (System wise)
- Musculo-skeletal system
- Respiratory system
- Cardiovascular system
- Digestive system
- Endocrine system
- CNS system
- Urinary system
- Reproductive system
- Organs of special sense

Disease, disorders and dysfunctions
- Musculo- skeletal system
- Respiratory system
- Digestive system

Common Medical Terms
Common medical terms and meaning of those terms

Signs and Symptoms
Common sign and symptoms of disease conditions

HIM Practicum I

This first professional practice experience utilizes the applied areas of health information management (hospital facilities). Students will be exposed to a variety of health information management (HIM) applications such as Master Patient Index (MPI). HIM tasks include abstracting, chart tracking, document imaging, deficiency analysis, release of information, patient registration, transcription and functions of MRD. Students will submit reports after each areas of posting.

Second Semester

Health Information Management

Fundamentals of Health Information Management:
- Important event in history of medicine and medical documentation, personalities and their contribution to medicine and Health Information Management.
- Definition, Goals & Objective, Characteristics, Purpose, Values of Health Information Management to the various users.

Numbering System of Health Information Management:
Definition, merits and demerits of Unit, Serial, Units Serial numbering system.

Filing system of Health Information Management:
Definition, merits and demerits of Straight, Middle and Terminal Digit fling system.

Format of Health Information Management:
Definition, Format, Advantages & Disadvantages of Source oriented Health Information Management, Integrated Health Information Management, Problem oriented Health Information Management

Contents of Health Information Management & form designing:
Definition, Purpose and Contents of various forms used to document the patient health information. Various rules involve in form designing

Indexes and Registers:
Definition, Format and Uses of: Master Patient Index Card, Disease Index Card, Physician Index Card, Operation Index Card, Various Registers used for the maintenance of patient information.

Analysis of Health Information Management:
Definition, Importance, Reasons and methods involved in quantitative and qualitative Analysis.

Management and Control of Health Information Management in a health care facility:
Movement and Control of various medical records in hospital and Health Information Management department, various physical facilities required for the maintenance of Health Information Management, Basic rules for the handling of Health Information Management in health care facilities.

Computerization of Health Information System:
Needs of computerization, Process involved in computerization, Advantage and Disadvantages

Microfilming of medical records:
Microfilming Process, Equipment required for microfilming, Merits and Demerits of Microfilming

Color Coding of Medical Records:
Definition, Reason, Types, Advantages, Storage medium

Disease Classification Systems

Subject expose student to the healthcare vocabularies and also the representation of clinical data through the use of medical vocabularies and clinical classification systems. Emphasis is on developing expertise in identifying appropriate clinical classification systems and medical vocabularies, identifying their appropriate uses and sources, and applying them within and among health information systems to promote effective communication. Standard clinical terminologies including SNOMED, ICD 10, ICD-9-CM, ICD-10-CM, and ICD-9-PCS, ICPM, CPT/HCPCS, National Drug Codes and healthcare vocabularies and clinical terminologies in the electronic health record.

Quality Management in Health Services

Subject covers diverse perspectives in quality management and regulation including relevant research and management methodologies of quality, cost and access to healthcare with a focus on the role of health information management. Overview of performance improvement, methods and applications in the area of outcomes research including practice variation, risk adjustment, quality measures and quality management (or quality improvement), practice guidelines, evidence-based medicine, clinical decision support, health-related quality of life, utility assessment, economic evaluations (including cost- effectiveness studies).

Database Management System
MS-Access
- Data Modeling
- Introduction to MS-Access
- Forms, Filters and Queries
- Charts and Reports
- Command Buttons, Macros and Database Maintenance

Internet and HTML
- Introduction
- WWW, TELNET, FTP TCP / IP
- Electronic mail
- HTML

Visual Basics
- Introduction to VB
- Programming fundamentals

Medical Language II

This subject focuses on the development of medical terminology. In addition, students learn to articulate concepts of body systems, components within individual systems, and relationships between systems, for example, the division of the body into body cavities and planes. The remainder of the course applies the terminology of body systems to issues of disease, diagnostic and therapeutic tests, and procedures.

Management & Organizational Behavior
Manager and Managing

Importance of Management **-** Definition of Management **-**Characteristic features of Management **-** Roles of Management**-**Role of a Manager**-**Levels of Management and their functions**-**Process of Management**-**Managerial skills**-**Management and Administration**-**Management – Science or an Art?**-** Management – a profession?

Evolution of Management Thought
Meaning of principle, Nature of Management principles, Need for Management principles- Early Management approaches - Scientific Management-Administrative Management-Human Relation Movement-Modern Management approaches-Behavioral approach-Quantitative approach-System approach - Contingency approach

General Management
Planning –Organization-Decision Making-Communication-Staffing-Directing-Motivation-Counseling - Mentoring –Leadership

Organizational Behaviour
Personal Growth and Development
Definition, characteristics, determinants, causes, Theories (Type, Trait, Intrapsychic, Social learning, Skimmer's)

Thinking and Decision making process
Human Information Processing -Approaches (Lens model, Cognitive approach, Process training approach)- Phases of decision making- Types of decision making- Decision cycle- Behavioral decision making- Decision rationality - Models of behavioral decision making-Use of heuristics- Thinking – process, images, language-Concepts- Problem solving- Creative thinking

Perception
Definition- Factors- Perceptual grouping and selectivity - Stimuli selection- Barriers - Honing perceptual skills

Attitudes and values
Definition, Characteristics, Functions and Formation of attitudes-Definition, types, formation of values-Values and behavior- Values and ethics- Values and attitudes

Learning
Definition – Components –Determinants- Theories (classical, operant, cognitive, social learning)- Principles of reinforcement- Punishment- Learning curves- Learning and behavior

Biostatistics & Research Methodology
Introduction
Introduction to Biostatistics & research methodology, Types of variables & scales of measurements, Measures of central tendency and dispersion, Rate, Ratio, Proportion, Incidence & Prevalence

Sampling
Random & non- random sampling, Various methods of sampling, Simple random sampling, Stratified, Systematic, Cluster, Multistage, Sampling & Non sampling errors, Methods of minimizing errors

Basic probability distribution & Sampling distributions

Concept of probability distribution- Normal, Poisson & Binomial distribution-Parameters & Applications-Concepts of sampling distribution-Standard Error & Confidence Interval

Skewness & Kurtosis

Tests of Significance

Basics of Testing of Hypothesis- Null & Alternate Hypothesis- Level of significance (Parametric) & power of test-p Value-Tests of significance- test (Paired & Unpaired),Chi- Square test, Test of Proportion- One-way analysis of variance- Repeated measures of analysis of variance- Test of significance (non-parametric), Mann-Whitney U test, Wilcoxon test, Kruskal- Wallis analysis of variance, Friedmann's analysis of variance

Correlation & Regression

Simple correlation- Pearson's & Spearman's

Testing the significance of correlation coefficient linear & multiple regression

Sample size determination

General concepts- Sample size for estimating the means & proportion

Testing the difference in means and proportion of two groups

Study Designs

Descriptive Epidemiological Methods- Case series analysis and prevalence studies

Analytical epidemiological methods- Case- Control & Cohort studies

Clinical trials/ Interventional studies

Odds ratio & Relative risk

Stratified Analysis

Multivariate Analysis

Concept of multivariate analysis- Introduction to logistic regression & survival analysis

Reliability & Validity evaluation of diagnostic tests
Format of scientific document

Structure of research protocol -Structure of thesis/ research report- Formats of reporting in scientific journals - Systematic review - Meta-analysis

HIM Practicum II

This second professional practice experience takes place in a health information management department of an acute healthcare facility. Students are supervised by a qualified personnel assigned by the healthcare facility, and are provided with practical experiences that ground the theories acquired in prior coursework. The PPE focuses on departmental functions, quality assessment and performance improvement, computerized information systems, organizational resources and management, billing and reimbursement, document imaging, and the electronic health record.

Third Semester

Healthcare Financing
Financial Management for Health Professionals

This course will provide an overview of financial accounting and financial management principles that focuses not only on health informatics and information management but the health care industry as a whole. It is a blend of theory and practice, incorporating readings from the text books and problems to develop the

student's financial management and decision-making skills as future health care leaders. Without effective financial management, health care organizations/providers cannot fulfill their mission of provided needed services to their customers. Healthcare is a complex business and as such, the organizations success depends on the leadership of managers who understand and can apply key financial principles to help the organization meets it core business goals.

Basics of Financial Management
The course aims to give a fair view of exposure to the students on the basic concepts of accounts, Finance and Financial Management in Hospital and practical application in Hospital Financial Management Accounting and Health Insurance.

The Nature and purpose of Accounting, Accounting Concepts & Accounting records:
- What is accounting information? Who needs it? What they need or expect? What do accountants do?
- Single Entry Book – keeping
- Double Entry Book - keeping
- What is an Account? Making entries.
- Five types of Accounts (Income, Expense, Asset, Liability, Capital) Book – keeping rules
- Accounting books/ledgers (Nominal, Purchase, Sales, Journal etc)
- Dealing with cash, imprest system

Preparation of various Financial Statements:
- Trial Balance
- Receipts and Payments
- Income and Expenditure Account
- Balance Sheet

Fixed assets and Depreciation:
- What are fixed assets and why are they different?
- What is depreciation and why do we need it?
- How do we calculate depreciation? (pros and cons of different methods)
- Accounting entries for depreciation

Costing and Pricing:
- Financial accounting Vs. Cost accounting
- Key terms: Direct/indirect, fixed/variable/semi-variable
- Analysing results: Standard/budgeted/actual
- Costing hospital services
- Taken action: controllable /uncontrollable
- Making decisions: Marginal/book/out –of pocket costs
- Reporting costs: Cost Centres, allocation and apportionment of costs
- Pricing methods and decisions.

Inventory Accounting:
- Inventory / stocks
- Valuation (FIFO, LIFO, WAC etc) Optimum balance and reorder levels.

Analysis of Financial Statements:
- Ratio analysis – meaning and purposes
- Ratios applicable to Non-profit making organizations

Financial Planning and Control:
Budgets and budgetary control

Use of Computers in Accounting:
- Computerised ledger systems
- Spreadsheets & Excel based accounting

Accounting and Audit Procedures in Health Care Sector:
- Accounting System in hospital
- Purpose of an audit and auditing principles
- What the auditor does?
- The audit report – "True and Fair View"
- Legal requirements: layout, audit and filing of accounts

Health Insurance and Third Party Payers
- Definition and history of Health Insurance
- Concepts in Health Insurance
- Issues in Health Insurance
- Effective Health Insurance
- Good & Bad in Health Insurance
- Reasons for lack of coverage
- Denial of claims
- Contracts or Memorandums of Understanding

Health Insurance in India
- Health Insurance & Third Party Administrators
- Insurance Regulatory Development Authority & its role
- Billing & Health Insurance Billing

Health insurance terminologies
Functions of a health financing system
- What is health insurance?
- History of health insurance

Values in health insurance
- Solidarity
- Risk pooling / sharing
- Equity
- Participation / empowerment

The health insurance framework
- Community
- Providers
- Organizer
- Insurer

Premium
- Benefit package
- Payments
- Administration
- Risk management
- Monitoring the programme

Types of health insurance
- Social health insurance
- Private health insurance
- Community health insurance (CHI)
- Government-initiated health insurance schemes (GHI)
- Differences in the four categories

Advantages of health insurance
Problems with health insurance
- Adverse selection
- Moral hazard
- Cost escalation
- Administrative costs
- Fraud

Health insurance in India
- Social Health insurance
- Voluntary (commercial) health insurance
- Daily hospitalization expenses – Royal Sundaram's Hospital Cash
- Critical illness cover – ICICI Prudential's Crisis cover
- Community health insurance (CHI)
- Government-initiated health insurance schemes

Recent advances in health information management
Advanced Topics in Health Information Management (Seminar)
A capstone seminar in which students present the results of their Final Applied Projects and explore current issues relative to the field of Health Information Management in a rapidly changing health care delivery system.

Issues in Health Information Technology Seminar

An exploration of current issues related to health informatics including healthcare policy analysis and development, ethical issues, structure of healthcare delivery systems, assessment of population health, models of health care delivery, access and quality of care issues. Prerequisites: 600 MHIM, Information Technology and Systems, and 605 MHIM, Health Information Systems.

Hospital Administration

Assessing Healthcare Quality

Assess outcomes research activities, exert leadership in implementing clinical outcomes measurement projects/programs within healthcare organizations and systems. The course focuses on the role patient-centered outcomes information plays in assuring that healthcare systems are able to establish cost- effective clinical practices that do improve the health, functional status and well-being of healthcare consumers, and accreditation and legislative initiatives impacting healthcare outcomes activities.

Strategic Management in Health

Subject explores the theory and leadership practice of strategy, strategic thinking and strategic management in healthcare for success in changing in turbulent times. Focus is on the phases of environmental assessment, business planning, implementation and evaluation. This prepares students to lead through organizational change, innovation, strategic management and execution. The subject serves as a core curriculum milestone for the HIM program and requires students to synthesize and integrate lessons learned in their previous management subjects.

Healthcare policies & standards

- Knowledge of applicable health law, regulations, accreditations standards, and certification requirements.
- Ability to evaluate compliance and develop compliant organisational policy
- Implement compliance auditing methods and techniques
- Implement ICT systems in compliance with applicable laws, regulations, standards and requirements

Clinical Workflow & Process Redesigning

This course explores how ancillary & clinical processes are designed and integrated together with the flow of information throughout a healthcare facility to bring decision-making value to healthcare professionals through quality information gathered in the most effective and efficient ways. Topics to be addressed include theory of quality and process improvement, workflow redesign, modeling techniques, use case scenario descriptions, clinical process reengineering, relationship to system infrastructure preparation and system build, outcomes measurement, and impact of change on organizational climate.

Professional Ethics in HIM

Fundamentals of medical ethics:

Law & Ethics – Definition, Goal, Scope, Basic Principles

Code of Conduct:
History and Development - Various code of ethics in medical and Health Information Management practice: Atreya Anushasana, Charaka Samhita, Sushruta Samhita, Hippocratic Oath, International Code of Medical Ethics, Code of Ethics for Biomedical Research, and Code of Conduct for Health Information Professionals

Ethical Issues in professional conduct of healthcare and health information professional:
Malpractice & negligence, Irrational Use of drug, Autonomy of patient Vs Paternalism, Informed Consent, Confidentiality, Sophisticated drug and Technology, Research, Clinical trial, Human Experimentation, Organ Transplantation

Ethical issues at the beginning and end of life:
Genetics, Right to life, Sex Pre-selection, Female feticide & Infanticide, Care of terminally ill patient, Euthanasia, Quality of life

Ethical Issues in social justice and equity in health:
Right to health, Health policy, Distributive justice in health care

Medico-legal aspects in healthcare practice:
Medico-legal case - Definition, Types, handling Medico-legal case in hospital. Regulatory framework in Indian Context: Indian Penal Code, Consumer Protection Act.

Healthcare Informatics

A survey of fundamental concepts of information technology applied to health care from the perspectives of providers, payers, consumers. Major topics include the electronic health record, health information systems, repositories and data bases, enterprise-wide systems, laboratory, radiology (PACs) systems, voice recognition, physician order entry, telemedicine, decision support systems. Overview of historical, current, and emerging health information systems; concepts and knowledge involved in making strategic use of information technology (IT) in health care organizations and linkages to business, planning, and governance; Overview of multiple systems, vendors, processes and organizations; methodology for evaluation of health information systems. Includes system design methodologies including systems analysis and design; systems selection and evaluation; workflow analysis and project management.

Additional subjects:

Medical Language & Classification Systems
Subject expose student to the healthcare vocabularies and also the representation of clinical data through the use of medical vocabularies and clinical classification systems. Emphasis is on developing expertise in identifying appropriate clinical classification systems and medical vocabularies, identifying their appropriate uses and sources, and applying them within and among health information systems to promote effective communication. Standard clinical terminologies including SNOMED, ICD 10, ICD-9-CM, ICD-10-CM, and ICD-9-PCS, ICPM, CPT/HCPCS, National Drug Codes and healthcare vocabularies and clinical terminologies in the electronic health record.

Change Leadership
Develop a systems-based way of thinking about leadership and how people function in the workplace, self-assess leadership thinking and behavior, establish goals for a higher level of leadership functioning, and integrate System-based Leadership and Change Management with models of change management and transition. Also, identify patterns of behavior that sabotage change in your system and internalize behavior for leading change in the organization.

Standard documentation Practices & Implementation

Subject covers components of EHR implementation as identified through case studies of best practices. Examine how the EHR impacts patient care through the availability of information and clinical decision support, create and use rules and clinical protocols/tools for the EHR, and develop training methodologies.

Information Technology and Systems

Broad coverage of technology concepts underlying modern computing and information management as well as survey of the field of health informatics to provide students with the foundation for the program of studies. Topics include overview of concepts in health informatics, information technology infrastructure, information systems management in healthcare, management IT challenges, interoperability and certification of computer systems, Internet, basic computer security including identity and access management, and meaningful use standards.

Quality Management in Health Services (Quality Assurance in healthcare)

Subject covers diverse perspectives in quality management and regulation including relevant research and management methodologies of quality, cost and access to healthcare with a focus on the role of health information management. Overview of performance improvement, methods and applications in the area of outcomes research including practice variation, risk adjustment, quality measures and quality management (or quality improvement), practice guidelines, evidence-based medicine, clinical decision support, health-related quality of life, utility assessment, economic evaluations (including cost- effectiveness studies).

Legal Issues in Health Information Technology and Systems

Examination of legal issues related to electronic-based health information; the growth of computer and communication technologies, including privacy, security, electronic data interchange and compliance related issues; policy, regulatory and related concerns; interpretation and implementation of enterprise information policy. Principles of law applied to the health field with emphasis on federal, state, and local laws affecting health information management practice, confidentiality, and security of information.

Leadership for Health Information Technology and Systems

Strategic management and planning, change management, leadership in e-health environment, project management including planning, scheduling, monitoring and reporting, process modeling. This course builds on the foundations of health information management or other professional preparation. Discussion of implementation of electronic health record systems, systems analysis from the enterprise level will be the focus of the class. Students are expected to develop a systems-thinking approach to leading health IT projects.

Knowledge Management

This course includes an overview of the application of decision analysis and knowledge-based systems and decision analysis techniques; Topics include data mining, data marts, data warehouses, clinical data repositories, OLAP and data modeling and obtaining information from clinical and administrative systems. Additional topics include the relationship and applicability of topics covered in other MHIIM courses in health information statistics, analysis, biomedical research and quality management, biostatistics, advanced research methods and biomedical research support to decision analysis and decision support, advanced information/data analysis and presentation techniques, evaluation methodologies.

Information security and Risk Management

Implement the analysis and management of risk across information systems through the application of the enterprise defined risk management policy and procedure. Assess risk to the organization's business, and document potential risk and containment plans. Collect data from health information data sources used for risk management reporting, Organize data for risk management reporting, Explain principles of risk management, Discuss the importance of risk assessment and management in healthcare, Develop and maintain a risk management program.: Define and make applicable a formal organizational strategy, scope, and culture to maintain safety and security of information including protected health information from external and internal threats (i.e., digital forensic for corporate investigations or intrusion investigation) and provide a platform for information security management where security policies are implemented and continuously monitored/enhanced. Integrate expertise external standards and best practices, Lead organizational initiatives related to integrity, confidentiality and availability of data stored on information systems and comply with all legal requirements

Fourth Semester

Applied Research Project

Rigorous project focused on a real-world informatics setting and application of problem-solving methods for development of solutions. This may include original research in the area of health information management, information systems and/or health informatics. Oral and written reports required, including oral presentation and defense of project.

Skills-based outcomes and monitorable indicators for Health Information Management Assistant Manager

S. No.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
1	Interpret terminologies, vocabularies and classification systems	Medical Terminology Disease classification system	Demonstrates the ability to interpret terminology according to the classification system	100
2	Examine required documentation and record structures	Different types of health records and its purpose.	Demonstrates the ability to identify and examine various health records	100
3	Identify data standard policies for exchange of health information	Interoperability standards	Is able to identify and adhere to data standards	200
4	Evaluate data to create meaningful presentations	Types of health care data and its uses, Statutory requirements of health care data	Is able to evaluate data on the basis of statutory requirements	200
5	Ensure a privacy and security infrastructure	Safety and legal aspects of health records and health information	Demonstrates the ability to ensure the safety and security of information	200
6	Create an environment to ensure compliance	Health record management and compliance requirements	Is able to comply with legal requirements	200
7	Comply with research administrative processes	Different purpose of health records.	Is able to comply with processes and policies	300

S. No.	Learning outcomes	Knowledge/comprehension	Applications / synthesis / evaluation	Hours
	and policies			
8	Oversee policies and technologies to protect data integrity	Health information system functions and designs	Is able to protect data integrity	300
9	Apply principles of management in the health information services	General management functions	Demonstrates the ability to manage health information services effectively	200
10	Evaluate staffing requirements and their performance	Staffing and recruitment policies, Performance management system and job responsibilities	Demonstrates the ability to anticipate and plan staffing requirements	350
11	Perform quality assessment health information systems	Quality Management principles Qualitative and Quantitative analysis of health record documentation	Demonstrates the ability to assess and manage quality continually	350
12	Demonstrate workflow concepts	Organizational functions and requirements	Is able to work according to organizational requirements	200
13	Analyze statistical data for decision making	Different statistical methods and application	Is able to perform statistical analysis	200
14	Analyze the security and privacy implications of electronic health data	Electronic health records	Demonstrates the ability to maintain the privacy and security of electronic health records	200
15	Evaluate health information systems and data storage requirements	Design and structure of HIS Functions of HIS	Is able to anticipate data storage requirements and design systems accordingly	350
	TOTAL			**3450**

Chapter 5
Job Description

Chapter 5: Job Description for all levels

Level 4

A Health Information Management Assistant should be able to:

- Collect and maintain health record data
- Apply ICD codes as per the guidelines
- Identify, compile, abstract, and code patient data, using standard classification systems.
- Assign the patient to diagnosis-related groups (DRGs), using appropriate computer software.
- Enter data, such as demographic characteristics, history and extent of disease, diagnostic procedures, or treatment into computer.
- Comply with ethical aspects of health records and the information it contains
- Utilize basic descriptive, institutional healthcare statistics
- Process patient admission or discharge documents.
- Transcribe medical reports.

Level 5

A Senior Health Information Management Assistant should be able to:

- Verify the documentation in the health record is timely, complete, and accurate
- Retrieve patient health information for physicians, technicians, or other medical personnel.
- Identify the legal use of health records and relevant documents
- Identify discrepancies between documentation and disease coding
- Resolve or clarify codes or diagnoses with conflicting, missing, or unclear information by consulting with doctors or others or by participating in the coding team's regular meetings.

Level 6

A Health Information Management Technologist should be able to:

- Verify that documentation in the health record supports the diagnosis and reflects the patient's progress, clinical findings, and discharge status
- Manage clinical indices/ databases/registries
- Utilize appropriate technology for data collection, storage, analysis, and reporting of health information
- Apply data extraction methodologies
- Identify the threats to data integrity and validity
- Manage health information for reimbursement purpose

Level 7

A Health Information Management Officer should be able to:

- Interpret health information standards
- Evaluate the accuracy of morbidity, mortality and procedural coding
- Analyze health information needs of stakeholders across the healthcare organization
- Evaluate health care data create meaningful presentations
- Analyze legal concepts and principles to the practice of HIM
- Contribute in the development of operational policies and procedures for health information exchange
- Release information to persons or agencies according to regulations

Level 8

An Assistant Manager (HIM) should be able to:

- Interpret terminologies, vocabularies and classification systems
- Examine required documentation and record structures
- Comply with research administrative processes and policies

- Oversee policies and technologies to protect data integrity
- Evaluate staffing requirements and their performance
- Analyze statistical data for decision making
- Protect the security of medical records to ensure that confidentiality is maintained
- Analyze the security and privacy implications of electronic health data
- Evaluate health information systems and data storage requirements

Level 9

A Deputy Manager (HIM) should be able to:
- Identify data standard policies for exchange of health information
- Evaluate data to create meaningful presentations
- Ensure a privacy and security infrastructure
- Create an environment to ensure compliance
- Apply principles of management in the health information services
- Perform quality assessment health information systems
- Demonstrate workflow concepts

Level 10

A Manager (HIM) should be able to:
- Monitor, assess and ensure effective use the use of department resources.
- Develop and maintain computerized record management system processes
- Develop and implement organizational policies and procedures for patient data services
- Oversee staff operations, business planning and budget development
- Plan and direct the health information management service areas, ensuring compliance with national and state regulatory requirements

Allied and Healthcare Professions

Allied and healthcare professionals includes individuals involved with the delivery of health or healthcare related services, with qualification and competence in therapeutic, diagnostic, curative, preventive and/or rehabilitative interventions. They work in multidisciplinary health teams in varied healthcare settings including doctors (physicians and specialist), nurses and public health officials to promote, protect, treat and/or manage a person('s) physical, mental, social, emotional, environmental health and holistic well-being.

The wide variation in the understanding of the concept of allied and healthcare professional, better known as 'paramedic', the nomenclature, and functions has led to the poor image of allied and healthcare sciences in India. The use of the word paramedic itself limits the activities of AHPs in the system. Hence, it is imperative to adequately compensate these professionals based on their qualifications and specialties. Despite a huge demand for services from this sector, allied and healthcare sciences is highly fragmented. As per the report 'From Paramedics to Allied Health Sciences', in total 138 courses of varied levels were identified during the process. Although it is estimated that there may be many more courses which are yet to be identified.

Considering the lack of regulatory mechanism following 15 core professional groups (accounting for around 44 professions) has been enlisted below **(The list is illustrative of the allied and healthcare professions. In future there may be addition or removal of certain professions based on the state of their regulation and standardization)**. **It also needs a mention that most of these professions are not restricted to the professional groups under which they have been categorized, their role may extend to other professional services too. Similarly, the categorization is an indicative categorization, however this may evolve over time based on deeper understanding of the roles and responsibilities of each professional group**:

1. **Healthcare Professions**
   1. Optometry
   2. Physiotherapy
   3. Occupational Therapy
   4. Nutrition Sciences
   5. Physician Associate and Assistants

2. **Allied Health Professions**
   6. Cardiology, Vascular and Pulmonary Technology
   7. Medical Laboratory Sciences
   8. Medical Radiology and Imaging Technology
   9. Neurosciences Technology
   10. Non- direct and Administrative services
   11. Primary Care and Community services
   12. Radiation Therapy
   13. Renal Technology
   14. Surgical and Anesthesia related Technology
   15. Trauma Care Services

The above mentioned groups account for over 44 job profiles in the allied and healthcare space, which are as follows-

A. **Healthcare Professions**
   1. Optometry
      a. Optometrist
   2. Physiotherapy

    a. Physiotherapist
  3. Occupational Therapy
    a. Occupational Therapist
  4. Nutrition Sciences
    a. Nutritionist
    b. Dietitian
  5. Physician Associate and Assistants
    a. Physician Associates and Assistants

B. Allied Health Professions
  6. Surgical and anesthesia related technology
    a. Anesthesia Assistants and Technologist
    b. OT Technologist
    c. Endoscopy Technologist
  7. Medical Laboratory Sciences
    a. Cyto-Technologist
    b. Dermatology/STD /Leprosy Lab Technologist
    c. Forensic Technologist
    d. Hemato-Technologist
    e. Histopath-Technologist
    f. Phlebotomist
    g. Medical and Clinical Lab Technologist
  8. Medical Radiology and Imaging Technology
    a. Radiographer
    b. Radiologic /Imaging Technologist
    c. Diagnostic Medical Sonographer
  9. Renal Technology
    a. Urology Technologist
    b. Dialysis Therapy Technologist
  10. Radiation Therapy
    a. Radiotherapy Technologist
    b. Medical Dosimetrist
    c. Nuclear Medicine Technologist
  11. Trauma Care Services
    a. Emergency Medical Technologist (paramedic)
    b. Critical Care/ICU Technologist
  12. Neurosciences Technology
    a. EEG/END Technologist
    b. EMG Technologist
    c. Neuro Lab Technologist
    d. Sleep Lab Technologist
  13. Cardiology, Vascular and Pulmonary Technology
    a. Cardiovascular Technologist
    b. ECG Technologist
    c. ECHO Technologist
    d. Perfusionist
    e. Pulmonary Function (PFT) Technologist
    f. Respiratory Therapist

14. Non- direct and Administrative Services
    a. Biomedical Engineers and Technologist
    b. Medical Assistant
    c. Medical Secretaries
    d. Medical Transcriptionist
    e. Health Information Management Technologist
15. Primary Care and community services
    a. Blood Bank Technologist
    b. Counselor- Integrated Behavioral Health Counselors, Palliative counselors etc.
    c. Sanitary Health Inspectors

References

<u>**General references**</u>

1. How to become a Medical Record Technician. [Internet][Cited on 22 Oct 2014]. Available from: http://www.innerbody.com/careers-in-health/how-to-become-a-medical-records-technician.html

2. Syllabus for Diploma in Health Information Management. [Internet][Cited on 22 Oct 2014]. Available from: http://web.tnmgrmu.ac.in/syllabus/DHIM2010.pdf

3. Diploma in Hospital Records Management, Bharathiar University; Coimbatore 641 046, [Internet][Cited on 22 Oct 2014]. Available from: http://www.b-ac.in/syl_college/1314/d9.pdf

4. Syllabus and Regulations, Bachelor of Health Information Management, The Tamil Nadu Dr. MGR Medical University, Chennai. [Internet][Cited on 22 Oct 2014]. Available from: http://web.tnmgrmu.ac.in/syllabus/alliedhealth/bscmrsc.pdf

5. Skill Development Training and Employment Generation in Healthcare (Para-Medical Courses), Government of Punjab, Department of Health & Family Welfare, Punjab. [Internet][Cited on 22 Oct 2014]. Available from: http://pbhealth.gov.in/Report%20on%20Paramedical%20courses-Final.pdf

6. Prospectus Admission 2014-15, Christian Medical College, Vellore, [Internet][Cited on 22 Oct 2014]. Available from: http://www.cmch-vellore.edu/pdf/education/prospectus.pdf

Other references

1 Narayan, K Kar, S Gupta, N. From 'Paramedics' to 'Allied Health Professionals': Landscaping the Journey and Way Forward. Public Health Foundation of India: New Delhi, India, 2012.

2 Allied Health Professions Federation. AHPs involvement in health and social care 2011. Available from: http://www.ahpf.org.uk/files/ahpf_gov_briefing_v7_09-05-11.pdf.

3 Narayan. K. How many doctors it takes to fix India's healthcare glitches? Deccan Herald [Internet]. 2014. Available from: http://www.deccanherald.com/content/381371/how-many-doctors-takes-fix.html.

4 Introduction to clerkship 1999. Available from: https://umanitoba.ca/faculties/medicine/media/missiion_goals_object_class_2011.pdf.

5 Standards of practice for ACT Allied Health Professionals 2005. Available from: http://health.act.gov.au/c/health?a=dlpubpoldoc&document=863.

6 Pamela Mitchell et al. Core principles and values of effective team based healthcare2012. Available from: https://www.nationalahec.org/pdfs/VSRT-Team-Based-Care-Principles-values.pdf.

7 Professionalism in nursing, midwifery and the allied health professions in Scotland. Scottish Government, 2012 978-1-78045-925-7.

8 Nursing & Midwifery Council .Standards for competence for registered nurses. Available from: http://www.nmc-uk.org/Documents/Standards/Standards%20for%20competence.pdf.

9 Social Accountability- A vision for Canadian medical schools Available from: https://www.afmc.ca/fmec/pdf/sa_vision_canadian_medical_schools_en.pdf.

10 University of Manitoba. Faculty of medicine teaching handbook2004. Available from: umanitoba.ca/faculties/medicine/media/teaching_handbook04.doc.

11 Medical Council of India. Vision 2015. Published March 2011. Available from: http://www.mciindia.org/tools/announcement/MCI_booklet.pdf.

12 Sherwin J. Competency-Based Medical Education Takes Shape2011. Available from: https://www.aamc.org/newsroom/reporter/april11/184286/competency-based_medical_education.html.

[13] Bushway D, Everhart D. Investing in Quality Competency-Based Education2014. Available from: http://www.educause.edu/ero/article/investing-quality-competency-based-education.

[14] Brookfield, S. D. Self-Directed Learning In: YMCA George Williams College ICE301 Lifelong learning Unit 1 Approaching lifelong learning. London: YMCA George Williams College; 1994.

[15] Ramnarayan K, Hande S. Thoughts on Self-Directed Learning in Medical Schools: Making Students More Responsible 2005. Available from: http://education.jhu.edu/PD/newhorizons/lifelonglearning/higher-education/medical-schools/.

[16] Harvey, B. J., Rothman, A. I., Frecker, R.C. Effect of an undergraduate medical curriculum on students' self-directed learning. Academic Medicine. 2003; 78(12): 1259-65.

[17] Credit-Based-Grading-System for Assessment of Students. Available from: http://www.presiuniv.ac.in/web/exam_assessment.php.

[18] Manual on semester based, credit and grading system Mumbai: University of Mumbai 2011. Available from: http://www.mu.ac.in/1__Manual_SCGS_Arts_09-06-2011.pdf.

[19] Vertical Integration2015. Available from: http://www.mcw.edu/Medical-School/Curriculum/Traditional-Curriculum/Vertical-Integration.htm.

[20] Baker D, Day R, Salas E. Teamwork as an essential component of high reliability organisations. Health Services Research. 2006; 41(4):1576-98.

[21] Srinivas, D.K. Adkoli, B.V. Faculty Development in Medical Education in India: The Need of the Day. Al Ameen J Med Sci (2009)2 (1):6-13. Available at: http://www.alameenmedical.org/ajms/ArticlePDFs/AJMS3.6-13.pdf

[22] Medical Records and Health Information Technicians. O*NET OnLine. Available from: http://www.onetonline.org/link/summary/29-2071.00

[23] International Labour Organization. Enhancing youth employability: The importance of core work skills. Skills For Employment: Policy Brief. 2013. Available from: http://www.ilo.org/wcmsp5/groups/public/---ed_emp/---ifp_skills/documents/publication/wcms_234467.pdf

[24] Fremgen B, Frucht S. Medical Terminology: A Living Language: Pearson Education, Inc. Available from: http://www.ogeecheetech.edu/docs/d_Programs/AlliedHealth/Syllabi/ALHS1090.pdf.

[25] Kong-lung H. Law and ethics in medical practice: An Overview. 2003; 8. Available from: www.fmshk.org/article/746.pdf.

[26] Texas Intensive English Program2014. Available from: https://www.tiep.edu/intensive-programs/.

[27] Mittal R, Mahajan R, Mittal N. Foundation programme: A student's perspective. International Journal of Applied and Basic Medical Research. 2013; 3(1):52-4. Epub 10.4103/2229-516X.112241.

DETAILS OF INVOLVED/RESPONSIBLE OFFICERS AT THE MINISTRY OF HEALTH AND FAMILY WELFARE (MOHFW)

1. Mr Ali R.Rizvi, Joint Secretary (Human Resource)
2. Mr B. Sriramachandra Murthy, Director (Allied Health Section)
3. Mr Satish Kumar, Under Secretary (Allied Health Section)

National Initiative for Allied Health Sciences – Technical Support Unit (NIAHS – TSU)

1. Ms Kavita Narayan, *FACHE*, Director, NIAHS-TSU at MoHFW, GoI
2. Ms Shivangini Kar Dave , Project Lead Coordinator
3. Ms Natasha D'Lima, Program Coordinator
4. Ms Namita Gupta, Consultant
5. Mr Sutirtha Mazumder, Senior Research Assistant
6. Mr Ashish Arora, Senior Research Assistant (former)
7. Ms Tanu Sri Sahu, Senior Research Assistant
8. Mr Akhilendra Trivedi, Senior Research Assistant
9. Mr Vivek Bhatnagar, Senior Research Assistant
10. Mr Anirooddha Mukherjee, Research Assistant

For additional details or queries, please contact:

1. Mr Uttam Sengupta, SO (AHS),
   Room 442 – A,
   Nirman Bhavan, New Delhi 110001.
   Phone: 23063720, Email: ahssection@gmail.com

2. NIAHS TSU,
   Facilitation Centre, Near Gate No 5,
   Nirman Bhavan, New Delhi 110001.
   Phone: 011-23061751, Email: ahpsforindia@gmail.com