MALLA REDDY
VISHWAVIDYAPEETH
(Deemed to be University)

SCHOOL OF DIGITAL HEALTH SCIENCES & TECHNOLOGY

Fellowship in Health Care Data Analytics and Visualization

Created in 2025

Academic regulations for fellowship programmes

1. **DEFINITION**

   Fellowship: A fellowship is an advanced, structured programme focused on developing specialized competencies after the completion of a qualifying degree or equivalent experience. It offers structured learning and practical experience in a focused area. The purpose of the fellowship is to develop advanced knowledge, strengthen specialized skills, and prepare participants for professional growth within their chosen field.

2. **AIMS AND OBJECTIVES**

   The aim of the program is to provide program nurtures graduate and postgraduate candidates, building their expertise and skills to drive career excellence and impact in their chosen field.

   Full-Time Candidate: A full-time candidate is an individual who is enrolled exclusively in the fellowship program and is not engaged in any other professional, academic or employment obligations during the training period. These candidates are required to dedicate their time and effort to the structured fellowship programme, meeting the assigned outcomes through full-time participation that ensures immersive training and continuous engagement in all programme activities, including assigned duties, learning sessions, and assessments. Stipends for full-time fellowship candidates will be awarded as per MRV policy.

   Internal Candidate: An internal candidate is an individual currently employed by MRV or its affiliated institutes who wish to enhance their skills through the fellowship during their tenure at the institution. This includes faculty, residents, or staff. Internal candidates are not eligible for a stipend. Applications are subject to institutional approval.

   External Candidate: An external candidate is someone not employed by MRV or its affiliated hospitals and institutes at the time of applying for the fellowship. They may come from other academic institutions, healthcare organizations, or private practice. External candidates are required to complete all fellowship requirements as per MRV guidelines. No stipend will be provided.

   Sponsored Candidate: A sponsored candidate is nominated and financially supported by a recognized institution, organization, or employer such as a government body, healthcare institution, academic organization, or industry partner to pursue a fellowship at MRV. The sponsor typically covers fees or other program-related costs and may require the candidate to fulfill certain obligations, if any, upon completion as required by the sponsor. Employees sponsored by organizations must provide a formal no-objection certificate. Sponsored candidates are not eligible for a stipend.

3. PREREQUISITES

Criteria	Details
Eligibility	To be eligible for admission into the fellowship program at MRV, candidates must meet the following criteria: • Hold a recognized graduate or postgraduate degree with a completion certificate. • The fellowship must align with the candidate's prior qualifications and may require professional registrations. • Detailed eligibility criteria for ach fellowship, including approved qualifications are available on the MRV website.
Duration	• Undergraduate Degrees – Any recognized undergraduate degree – 12 months • Postgraduate Degrees – Any recognized undergraduate degree – 6 months • Super specialty Degrees – Any recognized speciality or advanced degree – 3 months * Duration for any category may be adjusted based on program requirements, as recommended by the Selection Committee.
Mode of Study	Theoretical, Lab-based Development, Simulation Workshops, Clinical Scenario Building, Capstone Project, Practical, Skill, Case-based

4. SELECTION AND COMMENCEMENT OF FELLOWSHIP

Fellowship Committee: The Fellowship Committee is established to uphold principles of transparency, fairness, and meritocracy in the selection process for the MRV Fellowship Program.

Composition of Fellowship Selection Committee

Sr. No.	Role/Position	Description / Designation
1	Chairperson	The Dean of the respective colleges and Schools of Eminence at MRV
2	Subject Expert	A Professor or Associate Professor from the concerned colleges and Schools of Eminence, MRV
3	Guide / Co-Guide	A Professor, Associate Professor, or Assistant Professor from the concerned colleges and Schools of Eminence, MRV
4	Convener	The Fellowship Coordinator of MRV
5	Ex officio Members	The Registrar and the Controller of Examinations,

		MRV

Duties of the Fellowship Selection Committee

- Ensure that the MRV fellowship program commences twice a year in accordance with the academic calendar issued by the university.
- Oversee the preparation and communication of the program schedule, including application deadlines, interview dates, and the start of training through the MRV website and relevant academic departments.
- Thoroughly evaluate all applications to ensure candidates meet the minimum requirements for completion.
- Assess academic credentials, prior qualifications, and overall suitability for the fellowship program.
- Conduct interviews for shortlisted candidates to evaluate knowledge, skills, and overall preparedness.
- Recommend a final list of eligible candidates for approval by the Vice-Chancellor based on the evaluation and interview outcomes.
- Oversee all aspects of the fellowship program from scheduling, implementation, to completion.

5. FEE STRUCTURE

Program Fees: The basic fee structures for each fellowship program are available on the respective program on the MRV website.

6. PROCEDURE FOR SELECTION AND ADMISSION

- **Eligibility Check:** Verify that applicants meet the basic eligibility criteria, including academic qualifications, professional experience, and relevant skills.
- **Document Review:** The Selection Committee reviews all applications for completeness and ensures they satisfy the program's eligibility requirements.
- **Personal or Virtual Interviews:** Shortlisted candidates may be invited for interviews, either in person or virtually. This allows the Committee to assess communication skills, motivation, and overall suitability for the fellowship.
- **Merit-Based Selection:** The Committee selects the most qualified candidates based on a combination of academic performance, professional experience, interview performance, and alignment of the applicant's goals with the objectives of the fellowship.

7. ALLOTMENT OF FELLOWSHIP GUIDE

Assignment of Guides: The allotment of fellowship Guides shall be undertaken by the Selection Committee, ensuring that only eligible and approved faculty members are assigned as Guides or mentors.

Criteria for Allotment are based on:

- Alignment of the fellow's area of interest with the Guide's specialization
- Availability and consent of the Guide
- Existing rotation or merit-based preferences as determined by the Committee

Role and Responsibilities of the Guide:

- Mentoring the fellow to acquire required skills and academic knowledge
- Providing guidance and support to ensure progress throughout the fellowship

- Conducting regular evaluations and offering academic and professional advice and submit periodic report to the Fellowship coordinator
- Supporting the fellow in meeting program requirements and objectives

External Collaborators: External collaborators from recognized institution may serve as fellowship co-Guides in conjunction with a Guide from MRV.

Change of Guide: Fellows may request a change of Guide, subject to approval by the Selection Committee.

8. FELLOWSHIP PROGRAM DESIGN

The fellowship program is designed to provide a structured and comprehensive learning experience that develops relevant skills, knowledge, and professional competencies. Upon completion, they should demonstrate proficiency in core skills, apply their knowledge effectively in professional settings, maintain professional standards, and document their progress.

Logbook Maintenance: Fellows must maintain a logbook throughout the program. The required entries may vary depending on the fellowship. The logbook will be reviewed and evaluated on a daily or weekly basis by the assigned Guide. Regular face-to-face feedback sessions with the Guide will be conducted to monitor progress and provide guidance.

Final Assessment and Exit Examination:

The final assessment by the assigned guides includes the following components:

1. Multiple Choice Questions (MCQs): 25 marks
2. Practical Skills Assessment: Three case scenarios with discussion; each case carries 20 marks (total 60 marks)
3. Logbook Maintenance: 15 marks

The candidate must appear and secure a minimum of 50% marks in each of the above listed components. The total marks are 100, and a minimum aggregate score of 50% is required to successfully complete the fellowship.

Any additional outputs or deliverables may be determined in consultation with the Guide and require prior written approval from the Selection Committee.

9. MINIMUM STANDARD AND CREDITS FOR THE AWARD OF THE FELLOWSHIP

- Fellows must maintain a **minimum of 80% attendance** across all program activities.
- A **minimum overall score of 50%** is required to pass the fellowship.

10. FELLOWSHIP COMPLETION CERTIFICATE

Issued by MRV: Upon successful completion of all training, periodic evaluations, and final examinations, fellows will be awarded a certificate.

The certificate should include details such as:

- Name of the candidate
- Fellowship program details
- Program completion status

Fellowship in Health Care Data Analytics and Visualization

Course Overview

The Fellowship in Health Care Data Analytics & Visualization aims to develop advanced competencies in analysing, interpreting, and visualizing health data. The program trains participants to manage diverse health data from clinical, administrative, and public-health sources; apply statistical and machine learning methods; and deliver actionable insights through dashboards and visual reports. Through a mix of theory, practical workshops, and a capstone project, learners become proficient in transforming raw health data into evidence-based insights - to support patient care, operational efficiency, quality improvement, and health policy.

Course Objectives

1. Provide foundational knowledge in healthcare data types: clinical, administrative, public health, and operational data.
2. Build strong skills in data wrangling, cleaning, preprocessing, and integration of heterogeneous health datasets.
3. Teach statistical analysis and exploratory data analysis (EDA) methods tailored for health data.
4. Impart competency in data visualization, dashboard creation, and visual storytelling for healthcare stakeholders.
5. Introduce predictive analytics, basic machine learning, and analytics for population health, clinical outcomes, and operational efficiency.
6. Familiarize learners with data governance, privacy, confidentiality, and ethical/regulatory considerations in health data.
7. Enable application of analytics to real-world problems: patient outcome prediction, resource utilization optimization, quality measurement, public health surveillance, and policy planning.
8. Equip learners to lead data-driven decision-making and analytics initiatives in hospitals, public health agencies, NGOs, and research organizations.

Curriculum with Part-wise Syllabus & Modules

Part 1: Foundations & Data Handling in Health Care Analytics

Module	Topics Covered
Introduction to Health Care Data & Analytics	Overview of healthcare data: clinical, administrative, claims, public health, device/wearable data Role and importance of analytics in healthcare Types of analytics — descriptive, diagnostic, predictive, prescriptive
Data Collection, Cleaning & Integration	Data sources and formats; data import/export; handling missing data; data cleaning; merging heterogeneous datasets; data preprocessing; data quality assessment
Statistical Methods & Exploratory Data Analysis (EDA)	Descriptive statistics, distributions, summary statistics (mean, median, variance, SD), frequency tables; exploratory analysis; data profiling; detecting outliers; data visualization basics for EDA
Data Governance, Privacy & Ethics in Health Data	Data privacy & confidentiality; ethical use of health data; regulations and standards (data protection laws, consent, anonymization/de-identification, patient confidentiality, governance)
Data Visualization Techniques for Health Data	Principles of effective visualization; chart types; dashboards; storytelling with data; visualization tools (e.g., Tableau, Power BI); communicating data insights to clinical and administrative stakeholders

Part 2: Advanced Analytics, Machine Learning & Applied Healthcare Analytics

Module	Topics Covered
Predictive Analytics & Machine Learning in Healthcare	Introduction to predictive modelling, regression, classification; risk prediction; disease outcome forecasting; performance measurement; basics of model evaluation; ethical use of ML
Population Health Analytics & Public Health Data	Analysis of population-level data; epidemiological statistics; trend analysis; health surveillance; outcome measurement; resource allocation analytics; health services utilization; public health dashboards
Operational & Hospital-level Analytics	Hospital operations data: admissions, bed occupancy, staffing, supply chain; optimizing workflows; cost analytics; quality metrics; performance dashboards; operational decision support
Advanced Data Visualization & Dashboard Projects	Interactive dashboards; heatmaps, treemaps, boxplots; advanced charts; KPI dashboards for clinical, operational, financial metrics; visual storytelling; report generation for stakeholders
Capstone Project	Individual or group project: analyze a real (or simulated) health dataset, apply analytics and visualization techniques, build dashboard/report, derive actionable insights, and present findings

Program Outcomes

SR.N.	Program Outcome	Detailed Description
1	Understand Health Data Ecosystems	Describe different types of healthcare data sources and their relevance (clinical, operational, public health, administrative)
2	Perform Data Handling & Preprocessing	Clean, integrate and manage heterogeneous health datasets, ensuring data quality and integrity
3	Apply Statistical & Analytical Methods	Conduct exploratory data analysis, statistical summaries, and basic analytics for healthcare datasets
4	Develop Data Visualizations & Dashboards	Design and build data visualizations, dashboards, and reports to communicate findings to stakeholders
5	Use Predictive Analytics & ML for Healthcare Insights	Build predictive models for patient outcomes, risk stratification, operational forecasting, and public health trends
6	Translate Data into Actionable Healthcare Decisions	Interpret analytics outputs to support clinical decisions, resource allocation, policy planning, and operational improvements
7	Ensure Data Governance, Ethics & Privacy	Implement data governance, privacy, and ethical practices in handling health data
8	Lead Health-Data Driven Projects	Plan and execute data-driven projects in hospitals, public health organizations, or research settings; communicate results effectively

Course Outcomes

	Course Outcome	Detailed Description
1	**Describe Types of Health Data & Their Uses**	Identify different health data sources and their applications
2	**Clean & Preprocess Health Data**	Perform data cleaning, integration, handling missing values, data validation
3	**Conduct Exploratory Data Analysis (EDA)**	Use statistical summaries and visualizations to explore and understand datasets
4	**Create Effective Visualizations & Dashboards**	Build dashboards and visual reports suitable for clinical and administrative use
5	**Build Basic Predictive Models**	Apply regression or classification models for risk prediction, outcome forecasting, or operational predictions
6	**Analyze Population & Public Health Data**	Perform trend analysis, population level statistics, health surveillance analytics
7	**Conduct Operational/Hospital Data Analytics**	Analyze hospital operational data — e.g. bed occupancy, resource utilization, workflow efficiency
8	**Design & Present Data-Driven Health Projects**	Carry out a capstone project: data analysis + visualization + insights + presentation/report
9	**Uphold Ethical & Regulatory Standards**	Ensure all analytics and data handling practices comply with data privacy, ethics, and governance guidelines

Recommended Books & E-Resources

Textbooks:

- Health Care Analytics: From Data to Knowledge to Healthcare Improvement – Hui Yang & Eva K. Lee
- Biomedical Informatics: Computer Applications in Health Care & Biomedicine – Edward H. Shortliffe
- Data Visualization: A Practical Introduction – Kieran Healy
- Practical Statistics for Medical Research – Douglas G. Altman
- Python for Data Analysis – Wes McKinney (for learners using Python)
- Machine Learning for Healthcare – various edited collections / domain-specific publications

Journals & E-Resources:

- ABDM official portal: https://abdm.gov.in
- NDHM Sandbox documentation
- HL7 International – https://www.hl7.org
- SNOMED CT Documentation – https://snomed.org
- WHO Digital Health Guidelines
- NPTEL: Health Informatics
- MIT OpenCourseWare – Medical Informatics