Course Overview of B.Sc. in Diabetic Sciences (4-Year Undergraduate Program 8 semesters)

Overview: A B.Sc. in Diabetic Sciences is a specialized undergraduate program which is designed to equip the students with in-depth knowledge and practical skills pertaining to the prevention, diagnosis, treatment, and management of diabetes. The course is mainly focused on understanding the biological, physiological, and lifestyle-related aspects of diabetes mellitus, which is one of the most common chronic diseases globally. This program is ideal for students who want to pursue a career in healthcare, focusing on diabetes care, research, or patient support**.**

Affiliated Institution: School of Medical Sciences and Technology, Malla Reddy Vishwavidyapeeth (Deemed to be University)
****** The minimum eligibility for B.Sc. Diabetic Sciences is a pass in 10+2 with at least 50% marks in Physics, Chemistry and Biology from a recognized board (CBSE/ISC/PUC) or equivalent

Key Highlights of B.Sc. in Diabetic Sciences @ Malla Reddy Vishwavidyapeeth

- Focused Expertise: Students gain specialized knowledge in diabetes care, its causes, and its management.
- Hands-on Training: Practical sessions, clinical training, and exposure to real-world healthcare settings are part of the curriculum.
- Multidisciplinary Approach: The program integrates aspects of medicine, nutrition, healthcare, and public health to give a holistic view of diabetes management.
- Growing Demand: With the rising prevalence of diabetes worldwide, professionals trained in diabetic sciences are increasingly in demand.
- Career Opportunities: Graduates can work in hospitals, research centers, private clinics, public health organizations, and non-governmental organizations (NGOs).

Course Curriculum

- Graduates of the B.Sc. in Diabetic Sciences can pursue a range of career options in healthcare, research, and public health. Some key career paths include:
- Diabetes Educator: Specializing in educating patients about self-management of their condition.
- Clinical Researcher: Conducting research in diabetic care, treatment, and new therapies.
- Endocrinologist Assistant: Working with medical professionals specializing in diabetes and endocrine disorders.
- Dietician/Nutritionist: Developing nutrition plans for diabetic patients and providing dietary counseling.
- Diabetes Care Coordinator: Managing the care of diabetes patients in hospitals or clinics.
- Public Health Specialist: Creating awareness campaigns, managing public health programs, or working with NGOs focused on diabetes prevention.

- Pharmaceutical Representative: Working with companies that produce diabetic medications and devices.

Academic Opportunities

- After completing a B.Sc. in Diabetic Sciences, students can pursue further studies to enhance their knowledge and skills. Some academic opportunities include:
- M.Sc. in Diabetic Sciences or Clinical Research: Focus on advanced clinical practices or research in diabetes care.
- M.D. in Internal Medicine or Endocrinology: Specialization in treating and managing diabetes as a doctor.
- M.P.H. (Master of Public Health): If interested in managing diabetes at the community or population level, especially through policy, education, and outreach.
- Diploma Courses: In areas such as Diabetic Nutrition, Diabetes Management, and Clinical Research.
- Ph.D. in Diabetic Research: For those interested in advanced research or academic roles.

Professional Opportunities for B.Sc. in Diabetic Sciences Graduates

- Graduates of a B.Sc. in Diabetic Sciences are well-equipped to pursue various professional careers that address the needs of diabetic patients and the growing demand for diabetes management. Here are some key professional opportunities:
- Diabetes Educator/Counsellor
- Clinical Dietician /Nutritionist
- Endocrinology Assistant
- Diabetes Care Coordinator
- Public Health Specialist
- Pharmaceutical or Medical Device Representative
- Clinical Research Assistant/Coordinator
- Healthcare Administrator in Diabetes Care Centers
- Medical Writing/Content Specialist in Diabetes
- Diabetes Specialist in Rehabilitation Centers

Higher Education Opportunities

Graduates from a B.Sc. in Diabetic Sciences can pursue advanced studies in various specialized fields to deepen their knowledge and expertise in diabetes management, healthcare, and related disciplines:

- Master of Science (M.Sc.) in Diabetic Sciences
- Master of Science (M.Sc.) in Clinical Research
- Master of Public Health (MPH)
- Postgraduate Diploma in Diabetic Nutrition
- Master of Business Administration (MBA) in Healthcare Management
- Master of Science (M.Sc.) in Endocrinology

- Doctor of Medicine (MD) in Internal Medicine or Endocrinology
- Ph.D. in Diabetic Research or Molecular Medicine

Research Prospects

Diabetic sciences offer abundant research opportunities, and the field is constantly evolving with new treatments, management strategies, and technological advancements. Some key research prospects include:

- Clinical Trials for New Diabetes Medications
- Diabetes and Genetics Research
- Innovations in Diabetes Monitoring
- Preventive Strategies and Early Intervention
- Diabetic Complications and Management
- Diabetes and Technology Integration
- Psychosocial Aspects of Diabetes Care

Conclusion

A B.Sc. in Diabetic Sciences opens up a wide array of professional opportunities in both clinical and non-clinical fields, from patient care to public health and pharmaceutical roles. The program also lays a strong foundation for higher education in advanced clinical and research fields. With the global rise in diabetes prevalence, the field offers significant potential for research into innovative therapies, preventive strategies, and technological solutions. This makes it a promising and rewarding career path for those interested in healthcare and diabetes management.

Labs:

1. Clinical Biochemistry & Endocrinology Lab

- **Purpose**: Understanding metabolic functions, hormone regulation, and diabetes-related biochemical markers.
- **Equipment & Facilities**:
  - ✓ Automated biochemical analyzers
  - ✓ Glucose and HbA1c testing kits
  - ✓ ELISA kits for insulin and C-peptide levels
  - ✓ Blood gas analyzers for acid-base balance
  - ✓ Lipid profile and renal function testing

2. Diabetic Screening & Monitoring Lab

- **Purpose**: Hands-on training in diagnosing and monitoring diabetes.
- **Equipment & Facilities**:

  - ✓ Glucometers and continuous glucose monitoring (CGM) devices
  - ✓ HbA1c analyzers for long-term glucose control assessment
  - ✓ Ketone meters for diabetic ketoacidosis detection
  - ✓ Insulin pumps and automated insulin delivery systems
  - ✓ Point-of-care testing (POCT) devices

3. Diabetic Foot Care & Wound Management Lab

- **Purpose**: Prevention, diagnosis, and treatment of diabetic foot ulcers and neuropathy.
- **Equipment & Facilities**:

  - ✓ Monofilament and vibration testing tools for neuropathy screening
  - ✓ Doppler ultrasound for vascular assessment
  - ✓ Foot pressure mapping systems
  - ✓ Wound dressing materials and debridement tools
  - ✓ Hyperbaric oxygen therapy (HBOT) simulation tools

4. Diabetic Retinopathy & Ophthalmology Lab

- **Purpose**: Understanding eye complications due to diabetes.
- **Equipment & Facilities**:

  - ✓ Fundus photography and retinal imaging systems
  - ✓ Optical coherence tomography (OCT) for retinal screening
  - ✓ Slit-lamp examination setups
  - ✓ Fluorescein angiography tools
  - ✓ Diabetic retinopathy grading and assessment software

5. Nutrition & Dietetics Lab

- **Purpose**: Training in meal planning, nutritional assessment, and diet counseling for diabetic patients.
- **Equipment & Facilities**:

  - ✓ Body composition analyzers (BIA, DEXA)
  - ✓ Calorimeters for metabolic rate assessment
  - ✓ Food models and portion measurement kits
  - ✓ Diet planning software (NutriSurvey, Food Processor)
  - ✓ Glycemic index and glycemic load assessment tools

6. Exercise & Lifestyle Modification Lab

- **Purpose**: Understanding the impact of physical activity on diabetes management.
- **Equipment & Facilities**:

  - ✓ Treadmills and ergometers for exercise testing
  - ✓ VO2 max and lactate threshold testing tools
  - ✓ Heart rate monitors and wearable fitness trackers
  - ✓ Yoga and physiotherapy setups
  - ✓ Virtual reality-based lifestyle modification training

7. Diabetic Nephropathy & Kidney Function Lab

- **Purpose**: Assessing kidney function and diabetes-related renal complications.
- **Equipment & Facilities**:

  - ✓ Urine albumin-creatinine ratio (ACR) testing kits
  - ✓ Serum creatinine and eGFR analyzers
  - ✓ Microalbuminuria and proteinuria detection tools
  - ✓ Dialysis training simulations (optional)
  - ✓ Kidney biopsy processing tools for research purposes

8. Diabetic Neuropathy & Cardiovascular Lab

- **Purpose**: Evaluating the impact of diabetes on nerves and the cardiovascular system.
- **Equipment & Facilities**:

  - ✓ ECG and Holter monitoring devices for heart function assessment
  - ✓ Autonomic function testing equipment
  - ✓ Ankle-brachial index (ABI) kits for peripheral artery disease screening
  - ✓ Nerve conduction velocity (NCV) testing setups
  - ✓ Blood pressure monitors with variability assessment

9. Pharmacology & Insulin Therapy Lab

- **Purpose**: Understanding the role of medications, insulin therapy, and new drug development.
- **Equipment & Facilities**:

  - ✓ Insulin pens, pumps, and infusion devices
  - ✓ Oral hypoglycemic agent (OHA) simulation kits
  - ✓ Pharmacokinetics and pharmacodynamics software
  - ✓ Drug interaction and adverse effect monitoring systems
  - ✓ Research models for diabetes drug testing

10. Digital Health & Telemedicine Lab ***(Optional Advanced Lab)***

- **Purpose**: Exploring the role of AI, digital tools, and telemedicine in diabetes management.
- **Equipment & Facilities**:

  - ✓ Telehealth platforms for remote consultations
  - ✓ AI-based glucose prediction software
  - ✓ Mobile health (mHealth) applications for diabetes management
  - ✓ Virtual coaching and behavior modification tools
  - ✓ Cloud-based health data analytics platforms

Program Outcomes:

PO	Program Outcomes
PO-1	**Comprehensive Knowledge in Diabetic Science** Graduates will possess a thorough understanding of the pathophysiology, prevention, and management of diabetes and its complications, integrating fundamental and applied medical sciences.
PO-2	**Clinical Competence and Patient-Centric Care** Graduates will be equipped to deliver patient-centered care by assessing, diagnosing, and managing diabetes and related metabolic disorders through evidence-based practices.
PO-3	**Research and Innovation in Diabetes Management** Graduates will develop the ability to conduct independent research, critically analyze data, and contribute to innovative solutions in diabetes care and management.
PO-4	**Interdisciplinary Collaboration and Professionalism** Graduates will demonstrate effective communication, teamwork, and leadership skills to collaborate with healthcare professionals and provide ethical, culturally competent care.
PO-5	**Lifelong Learning and Community Engagement** Graduates will exhibit a commitment to continuous professional development and actively participate in community health initiatives, focusing on diabetes education, prevention, and public health awareness.

COURSE STRUCTURE – B.Sc. DIABETIC SCIENCES

Semester 1

Sl. No.	Broad Category	Course Code	Name of the Subject/Practical	Contact hours/week			Credits
				L	T	P	
1.	Major (Core)	BSDS101	Fundamentals of Human Anatomy & Physiology	2	1	0	3
2.		BSDS102	Introduction to Diabetes Mellitus	2	1	0	3
3.		BSDS103	Basics of Medical Biochemistry	2	0	2	3
4.		BSDS104	Basics of Endocrinology	1	1	0	2
5.	**Minor** Select any two minor courses, each worth 2 credits, for a maximum of 4 credits per semester	BSDS105	1. Pathophysiology 2. Nutrition & Metabolism 3. Diabetes and Public Health 4. Digital Health in Diabetes 5. Basics of Clinical Diagnostics	1 1	1 1	0 0	4
6.	Skill Enhancement Courses	BSDS106	Comprehensive Laboratory Practice SEM I				2
			1.Biochemistry Lab	0	0	2	
			2.Anatomy and Physiology Lab	0	0	2	
7.	Ability Enhancement Courses	BSDS107	English Communication Skills	0	0	2	1
8.	Value-Added Courses	BSDS108	1.Basics of Medical Ethics 2.Soft Skills & Professionalism in Healthcare	1	0	2	2
			Total	10	5	10	**20**
			Total Contact Hours	**25**			

Course outcomes for B.Sc. Diabetic Sciences MAJOR- Fundamentals of Human Anatomy & Physiology

Sr. No.	Course Outcome	Description
1	**Understand the Structural Organization of the Human Body**	Explain the levels of structural organization, from cells to organ systems, and identify major anatomical structures.
2	**Describe the Basic Functions of Organ Systems**	Understand the physiological functions of the cardiovascular, nervous, endocrine, digestive, renal, and musculoskeletal systems.
3	**Explain the Endocrine System and Its Role in Metabolism**	Identify key endocrine glands and their hormone secretions, with a focus on insulin, glucagon, and glucose metabolism.
4	**Analyze the Structure and Function of the Pancreas**	Describe the anatomy and histology of the pancreas, insulin secretion mechanisms, and the pathophysiology of diabetes.
5	**Understand the Physiology of Digestion and Nutrient Absorption**	Explain digestion, absorption, and metabolism of carbohydrates, proteins, and fats, and their influence on blood glucose levels.
6	**Explain the Cardiovascular and Renal Systems in Diabetes**	Understand the physiology of blood circulation, blood pressure regulation, and the role of the kidneys in glucose regulation and diabetes complications.
7	**Apply Knowledge of Nervous System Physiology**	Explain the autonomic nervous system's role in metabolic regulation and diabetic neuropathy.
8	**Develop a Clinical Understanding of Anatomy and Physiology in Diabetology**	Correlate anatomical structures and physiological functions with diabetes-related complications and clinical management.

Course outcomes for B.Sc. Diabetic Sciences MAJOR -Introduction to Diabetes Mellitus

Sr. No.	Course Outcome	Description
1	**Understand the Basic Concepts of Diabetes Mellitus**	Define diabetes mellitus, differentiate its types, and understand its global prevalence and risk factors.
2	**Describe the Physiology of Glucose Metabolism**	Explain the role of insulin, glucagon, and other hormones in glucose regulation and the pathophysiology of insulin resistance.

Sr. No.	Course Outcome	Description
3	**Recognize the Clinical Manifestations of Diabetes**	Identify common signs and symptoms, including acute and chronic complications (ketoacidosis, neuropathy, nephropathy, retinopathy, etc.).
4	**Explain the Diagnostic Criteria and Screening Methods**	Understand the diagnostic criteria (FPG, OGTT, HbA1c) and screening approaches for diabetes.
5	**Understand the Role of Lifestyle and Risk Factors in Diabetes**	Identify modifiable and non-modifiable risk factors and the impact of diet, physical activity, and obesity on diabetes.
6	**Explore the Principles of Diabetes Management**	Understand medical nutrition therapy (MNT) and pharmacological & non-pharmacological treatment strategies.
7	**Understand the Basics of Diabetes Prevention and Public Health Approaches**	Learn about preventive strategies, lifestyle interventions, and global public health policies for diabetes awareness.
8	**Develop a Foundation for Advanced Studies in Diabetology**	Establish a strong base for learning about diabetes complications, advanced management, and research.

Course outcomes for B.Sc. Diabetic Sciences MAJOR -Basics of Medical Biochemistry

Sr. No.	Course Outcome	Description
1	**Understand the Fundamentals of Medical Biochemistry**	Explain the structure, function, and metabolism of biomolecules (carbohydrates, lipids, proteins, and nucleic acids).
2	**Explain Carbohydrate Metabolism and Its Role in Diabetes**	Describe glycolysis, gluconeogenesis, glycogen metabolism, and the role of insulin and glucagon in glucose homeostasis.
3	**Understand Lipid Metabolism and Its Implications in Diabetes**	Explain fatty acid metabolism, ketogenesis, and the role of lipoproteins in diabetic dyslipidemia.
4	**Describe Protein and Amino Acid Metabolism**	Understand protein metabolism, the urea cycle, and the effects of diabetes on protein catabolism.
5	**Analyze the Role of Enzymes and Hormones in Metabolism**	Explain enzyme kinetics, regulatory mechanisms, and the role of hormones like insulin, glucagon, and cortisol in metabolism.
6	**Understand Oxidative Stress and Free Radicals in Diabetes**	Explain the role of oxidative stress, reactive oxygen species (ROS), and antioxidant defense mechanisms in diabetic complications.

Sr. No.	Course Outcome	Description
7	**Explain the Biochemical Basis of Diabetes and Its Complications**	Correlate biochemical alterations in diabetes with complications like ketoacidosis, neuropathy, nephropathy, and retinopathy.
8	**Apply Biochemical Techniques in Diagnosis and Monitoring of Diabetes**	Understand laboratory tests such as blood glucose estimation, HbA1c, lipid profile, and their clinical significance in diabetes management.

Course outcomes for B.Sc. Diabetic Sciences MAJOR -Basics of Endocrinology

Sr. No.	Course Outcome	Description
1	**Understand the Fundamentals of Endocrinology**	Explain the structure and functions of the endocrine system and its role in maintaining homeostasis.
2	**Describe Hormones and Their Mechanisms of Action**	Understand hormone classification, secretion, transport, receptor interactions, and signal transduction mechanisms.
3	**Explain the Role of the Hypothalamus and Pituitary Gland**	Describe the regulation of endocrine functions by hypothalamic and pituitary hormones and their impact on metabolism.
4	**Understand Pancreatic Endocrinology and Glucose Regulation**	Explain insulin and glucagon secretion, their role in glucose homeostasis, and their dysfunction in diabetes.
5	**Analyze the Endocrine Regulation of Metabolism**	Describe the roles of thyroid, adrenal, and growth hormones in metabolism and their relationship with diabetes.
6	**Understand Hormonal Imbalances in Diabetes and Related Disorders**	Explain the endocrine disorders linked to diabetes, such as metabolic syndrome, polycystic ovary syndrome (PCOS), and Cushing's syndrome.
7	**Explain the Role of Endocrinology in Diabetic Complications**	Understand the hormonal changes associated with diabetic complications such as neuropathy, nephropathy, and cardiovascular disease.
8	**Apply Endocrinological Concepts in Diabetes Management**	Correlate endocrine physiology with diabetes treatment approaches, including insulin therapy, oral hypoglycemic agents, and hormone replacement therapies.

Course outcomes for B.Sc. Diabetic Sciences MINOR – Pathophysiology

Sr. No.	Course Outcome	Description
1	**Understand the Basic Concepts of Pathophysiology**	Explain the fundamental mechanisms of disease processes, including cellular injury, inflammation, and repair.
2	**Explain the Pathophysiology of Diabetes Mellitus**	Describe the underlying mechanisms of Type 1, Type 2, gestational, and other forms of diabetes, including insulin resistance and beta-cell dysfunction.
3	**Understand the Acute Complications of Diabetes**	Explain the pathophysiological basis of diabetic ketoacidosis (DKA), hyperosmolar hyperglycemic state (HHS), and hypoglycemia.
4	**Describe the Chronic Complications of Diabetes**	Analyze the mechanisms leading to neuropathy, nephropathy, retinopathy, cardiovascular diseases, and diabetic foot ulcers.
5	**Understand the Role of the Immune System in Diabetes**	Explain autoimmune mechanisms in Type 1 diabetes and the role of chronic inflammation in Type 2 diabetes.
6	**Analyze the Interplay Between Diabetes and Other Metabolic Disorders**	Describe the pathophysiological links between diabetes, obesity, metabolic syndrome, dyslipidemia, and hypertension.
7	**Understand the Impact of Oxidative Stress and Inflammation in Diabetes**	Explain how oxidative stress, free radicals, and chronic inflammation contribute to diabetic complications.
8	**Apply Pathophysiological Concepts in Diabetes Management**	Correlate disease mechanisms with clinical symptoms, diagnostic findings, and therapeutic approaches for diabetes and its complications.

Course outcomes for B.Sc. Diabetic Sciences MINOR- Nutrition & Metabolism

Sr. No.	Course Outcome	Description
1	**Understand the Fundamentals of Nutrition**	Explain the role of macronutrients (carbohydrates, proteins, fats) and micronutrients (vitamins, minerals) in human health.

Sr. No.	Course Outcome	Description
2	**Describe the Digestion, Absorption, and Metabolism of Nutrients**	Explain how carbohydrates, proteins, and fats are digested, absorbed, and metabolized, with a focus on their impact on blood glucose levels.
3	**Analyze Carbohydrate Metabolism and Glycemic Control**	Understand glycolysis, gluconeogenesis, glycogen metabolism, and the role of insulin and glucagon in glucose regulation.
4	**Explain the Role of Lipid and Protein Metabolism in Diabetes**	Describe fatty acid oxidation, ketogenesis, and protein metabolism, and their implications in diabetes and obesity.
5	**Understand the Concept of Energy Balance and Metabolic Rate**	Explain basal metabolic rate (BMR), total energy expenditure (TEE), and their role in weight management and diabetes prevention.
6	**Explore the Relationship Between Diet and Diabetes Management**	Understand the role of dietary modifications, glycemic index, and medical nutrition therapy (MNT) in diabetes control.
7	**Explain the Impact of Micronutrients and Antioxidants on Metabolism**	Describe the role of vitamins, minerals, and antioxidants in metabolic processes and their significance in diabetes prevention and management.
8	**Apply Nutritional and Metabolic Principles in Diabetes Care**	Develop dietary recommendations and lifestyle interventions for effective diabetes management and prevention.

Course outcomes for B.Sc. Diabetic Sciences MINOR- Diabetes and Public Health

Sr. No.	Course Outcome	Description
1	**Understand the Epidemiology of Diabetes**	Explain the global and regional prevalence, risk factors, and burden of diabetes on public health.
2	**Analyze the Socioeconomic Impact of Diabetes**	Understand the economic, psychological, and social consequences of diabetes on individuals, families, and healthcare systems.
3	**Describe the Role of Public Health in Diabetes Prevention and Control**	Explain public health strategies, policies, and programs for diabetes prevention and management.
4	**Understand Lifestyle Modifications for Diabetes Prevention**	Identify the role of diet, exercise, and behavioral changes in reducing the risk of diabetes and its complications.

Sr. No.	Course Outcome	Description
5	**Explore Screening and Early Detection Strategies for Diabetes**	Describe population-based screening programs and risk assessment tools for early diagnosis and intervention.
6	**Explain Health Promotion and Education Strategies for Diabetes Awareness**	Understand community-based interventions, health campaigns, and patient education methods for diabetes awareness and self-care.
7	**Analyze the Role of Healthcare Systems in Diabetes Management**	Explain the importance of primary healthcare, multidisciplinary teams, and access to diabetes care services.
8	**Apply Public Health Approaches in Diabetes Control Programs**	Develop strategies for public health interventions, policy implementation, and disease surveillance to reduce the diabetes burden.

Course outcomes for B.Sc. Diabetic Sciences MINOR- Digital Health in Diabetes

Sr. No.	Course Outcome	Description
1	**Understand the Role of Digital Health in Diabetes Care**	Explain the concepts of digital health, telemedicine, and mobile health (mHealth) in diabetes management.
2	**Analyse the Use of Digital Tools for Diabetes Monitoring**	Describe the role of continuous glucose monitoring (CGM), insulin pumps, and smart wearables in blood glucose control.
3	**Explore the Impact of Telemedicine in Diabetes Management**	Understand the benefits, challenges, and applications of teleconsultation, remote patient monitoring, and virtual diabetes care.
4	**Describe the Role of Mobile Applications in Diabetes Self-Management**	Explain the use of diabetes management apps, medication reminders, and digital food tracking for better glycemic control.
5	**Understand the Integration of Artificial Intelligence (AI) and Big Data in Diabetes Care**	Analyze the role of AI, machine learning, and predictive analytics in diabetes diagnosis, treatment planning, and risk assessment.
6	**Evaluate the Importance of Electronic Health Records (EHR) in Diabetes Management**	Explain how digital records, cloud-based health systems, and data security improve patient care and treatment outcomes.
7	**Analyze Ethical, Legal, and Privacy Concerns in Digital Diabetes Care**	Understand data privacy laws, cybersecurity risks, and ethical considerations in using digital health technologies.

Sr. No.	Course Outcome	Description
8	**Apply Digital Health Solutions in Real-World Diabetes Management**	Develop strategies for integrating digital health tools in clinical practice, patient education, and public health initiatives.

Course outcomes for B.Sc. Diabetic Sciences MINOR- Basics of Clinical Diagnostics

Sr. No.	Course Outcome	Description
1	**Understand the Principles of Clinical Diagnostics**	Explain the fundamental concepts of laboratory medicine, diagnostic techniques, and their relevance in disease detection.
2	**Describe Common Diagnostic Tests in Diabetes**	Explain the significance of blood glucose tests (FPG, OGTT, HbA1c) and urine analysis in diabetes diagnosis and monitoring.
3	**Analyze the Role of Biochemical and Hematological Tests**	Understand lipid profiles, renal function tests, liver function tests, and complete blood counts in diabetic patients.
4	**Understand the Use of Point-of-Care Testing (POCT) in Diabetes**	Explain the applications of glucometers, HbA1c analyzers, and other rapid diagnostic tools for diabetes management.
5	**Describe the Role of Imaging in Diabetes Diagnosis**	Explain the use of Doppler ultrasound, fundus photography, and other imaging modalities in detecting diabetic complications.
6	**Understand the Importance of Microbiological and Immunological Tests**	Explain the significance of detecting infections (such as diabetic foot infections) and autoimmune markers in diabetes.
7	**Analyze Quality Control and Standardization in Clinical Diagnostics**	Understand the importance of accuracy, reliability, and standard protocols in laboratory testing for diabetes.
8	**Apply Diagnostic Knowledge for Diabetes Management**	Correlate diagnostic findings with clinical symptoms and treatment decisions to improve diabetes care.

Program Details

- **Duration**:4Years (8 Semesters)
- **Total Credits**: **160–180 credits**

- **Total Teaching & Training Hours**: **6,000–6,500 hours**
- **Mode**: Classroom, Laboratory, Clinical Training, and Internship
- **Assessment**: Continuous Internal Assessment (CIA), Semester-End Examinations, Practical Examinations, Clinical Case Presentations, and Research Project
- **Internship & Research**: One-Year Clinical Internship (Final Year)

Total Hours Distribution

- **Theory Classes** – 2,500–2,800 hours
- **Practical & Laboratory Training** – 1,500–1,800 hours
- **Clinical Training & Internship** – 1,000–1,200 hours
- **Research & Dissertation** – 300–500 hours

Assessment Methods

Assessment Component	Weightage (%)	Details
Continuous Internal Assessment (CIA)	**40%**	Includes internal exams, assignments, presentations, case studies, and practical performance
End-Semester Examination (ESE)	**60%**	Divided into theory (40%) and practical (20%)
Mid-Semester Exams	**20%** (Part of CIA)	Two internal tests per semester
Assignments & Case Studies	**5%** (Part of CIA)	Research-based assignments, patient case studies, and literature reviews
Seminars & Presentations	**5%** (Part of CIA)	Oral/poster presentations on diabetes management and treatment approaches
Practical Performance & Clinical Evaluation	**5%** (Part of CIA)	Skill-based assessments in diabetic labs and clinical settings
Attendance & Participation	**5%** (Part of CIA)	Regularity in theory & practical sessions

Assessment Component	Weightage (%)	Details
Theory Examination (Final)	**40%** (Part of ESE)	Structured written paper covering subject knowledge
Practical Examination (Final)	**20%** (Part of ESE)	Includes viva, skill demonstration, and clinical diabetes case handling
Dissertation/Research Project (Final Year)	**Mandatory**	Evaluated in the final year by internal & external examiners
Clinical Internship/Training in Diabetes Care Centers	**Pass/Fail**	Logbook-based evaluation with mentor review

Marking System & Grading

Marks (%)	Grade	Grade Point (GPA/CGPA Equivalent)	Classification
90 - 100	O (Outstanding)	10	First Class with Distinction
80 - 89	A+ (Excellent)	9	First Class with Distinction
70 - 79	A (Very Good)	8	First Class
60 - 69	B+ (Good)	7	First Class
50 - 59	B (Satisfactory)	6	Second Class
<50 (Fail)	F (Fail)	0	Fail (Re-exam Required)

Pass Criteria:

- **Minimum 50% marks in each subject** (Theory & Practical separately).
- **Aggregate of 55% required for progression** to the next semester.
- **No more than two backlogs** allowed for promotion to the final year.

Exam Pattern for Theory & Practical

A. Theory Examination Pattern

Total Marks: 100 (Converted to 40% for End-Semester Assessment)
Duration: 3 Hours

Section	Question Type	No. of Questions	Marks per Question	Total Marks
Section A	Short Answer Type (SAQ)	10 (Attempt all)	2	20
Section B	Long Answer Type (LAQ)	5 (Attempt any 4)	10	40
Section C	Case-Based/Clinical Scenarios	3 (Attempt any 2)	15	30
Section D	MCQs/Objective Type	10 (Compulsory)	1	10
Total				**100**

Weightage:

- Diabetes Pathophysiology & Biochemistry – 40%
- Clinical Management & Pharmacology – 30%
- Research & Case Studies in Diabetes – 20%
- Public Health & Preventive Strategies – 10%

Passing Criteria: Minimum **50% (50/100 marks)**

B. Practical Examination Pattern

Total Marks: 100 (Converted to 20% for End-Semester Assessment)
Duration: 4–6 Hours

Component	Marks Distribution
Clinical Case Presentation & Diabetes Assessment	30
OSCE (Objective Structured Clinical Examination) – Skill Demonstration	25

Component	Marks Distribution
Diet & Lifestyle Counseling for Diabetic Patients	20
Lab-Based Examination (Blood Glucose Monitoring, HbA1c Test, Lipid Profile Analysis)	15
Record Work (Logbook & Assignments)	10
Total	**100**

OSCE (Skill-based Assessment) includes stations on:

- Blood Glucose Monitoring & Insulin Administration
- Diabetic Foot Examination & Neuropathy Testing
- Meal Planning & Nutrition Counseling for Diabetics
- Interpretation of HbA1c & Lipid Profile Reports

Passing Criteria: Minimum **50% (50/100 marks)** in practicals.

Recommended Books & E-Resources

Textbooks

- **"Diabetes Mellitus: A Practical Handbook"** – Sue K. Milchovich
- **"Textbook of Diabetes"** – Richard Holt
- **"Clinical Diabetes Research & Management"** – Michael Roden
- **"Handbook of Diabetes Management"** – Donna Zazworsky

E-Resources & Journals

- **American Diabetes Association (ADA)** – www.diabetes.org
- **International Diabetes Federation (IDF)**
- **Diabetes Care Journal**
- **WHO Diabetes Management Guidelines**

Career opportunities after B.Sc. in Diabetic Sciences

- Diabetes Educator in Clinics & Hospitals
- Clinical Researcher in Endocrinology
- Nutritionist Specializing in Diabetes Care

- Diabetic Foot Care Specialist
- Pharmaceutical & Medical Device Industry (Diabetes Monitoring)