**OYAM INSTITUTE OF SCIENCES AND TECHNOLOGY**
*Strive for Distinctiveness*
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# BUSINESS INFORMATION SYSTEMS: MASTER'S EXAM MASTERY PROGRAMME

*OIST Online · ICT · course outline*
Issued 22 November 2026

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|---|---|
| Level | **Advanced** |
| Duration | **12 hours** |
| Weekly effort | **12 hours in total** |
| Content | **7 modules · 47 lessons · 18 h 59 min** |
| Format | **Online, self-paced** |
| Fee | **Free** |
| Certificate | **Certificate of Completion** |
| Instructor | **Eng. Emmanuel Ogwang, Chief Innovation Officer, Oyam Institute of Sciences and Technology** |

An intensive programme for M.Sc. technology students on six core topics: information systems and innovation, data management, business software development, database management, information security and IS ethics. It includes model answers, verified question banks, an integrated case and a timed mock exam.

## WHAT YOU WILL LEARN

- Define an information system, distinguish it from information technology, and explain its components, types and business value
- Identify innovation opportunities and the factors behind successful IS adoption
- Explain the data lifecycle, data quality dimensions, governance controls, ETL/ELT, warehouses, lakes, BI and KPIs
- Translate a business problem into functional and non-functional requirements and manage delivery with the SDLC, Agile, DevOps or low-code
- Compare build, buy, customise and outsource options and explain APIs, testing and maintenance
- Design a relational database with keys and normalisation, write a basic SQL join and explain ACID transactions
- Select an appropriate database model and administer it for reliability, security and performance
- Apply the CIA triad, layered controls, risk treatment and the six functions of NIST CSF 2.0
- Plan incident response and business continuity, and use the OWASP Top 10:2025 correctly
- Apply ethical principles, Uganda's data protection law and the OECD AI Principles to business decisions
- Write examination answers and an integrated improvement plan that earn full marks

## REQUIREMENTS

- Enrolment in, or completion of, a bachelor's degree in engineering, ICT, science or business
- A smartphone or computer with internet access for video lectures
- About 10 hours of study time, in one day or across two evenings

## ABOUT THIS COURSE

### About this course

This programme follows the six headings of a business information systems course outline. A business collects data, processes it in an information system, stores it in a database, delivers functionality through software, protects it with security controls and uses it responsibly within ethical and legal limits. Innovation happens when those parts are redesigned to create new value.

One illustration runs through every unit: a Kampala-based distributor with a sales team, warehouse, delivery fleet and customer support desk. Its transactions, stock records, mobile app, database, security policies and privacy decisions show how the six topics connect.

### The six topics

1. Information systems: importance and opportunities for innovation
2. Data management systems
3. Development of software for businesses
4. Database management systems for businesses
5. Security of information systems for businesses
6. Ethics in information systems

A seventh unit holds the revision toolkit: key distinctions, a glossary, twelve practice questions with answer directions, an integrated case and a timed mock examination.

### How it is taught

- Expert notes written concept ? explanation ? example, the structure examiners reward.
- Seventeen lectures from IBM, Harvard CS50, Harvard Business Review, Harvard's Justice course, Atlassian and IDEO.org, each matched to one concept and none repeated.
- Model answers, quizzes with explained answers, and question banks checked against the source textbooks.
- Current references: NIST Cybersecurity Framework 2.0, OWASP Top 10:2025, the OECD AI Principles (updated 2024) and Uganda's Data Protection and Privacy Act, 2019.

### Sources

Foundations of Information Systems and Principles of Data Science (OpenStax, CC BY 4.0); NIST CSF 2.0; OWASP Top 10:2025; OECD AI Principles; Data Protection and Privacy Act, 2019 (Uganda); Personal Data Protection Office guidance.

## COURSE CONTENT

### Module 1 · BIS-01 · Topic 01 · Information Systems: Importance and Opportunities for Innovation

Definition and components of an IS; IS versus IT; how an IS works; TPS, MIS, DSS, ESS, ERP, CRM and SCM; business importance; frameworks and standards; innovation opportunities and digital business models; business–IT alignment; adoption challenges and success factors.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 1.1 · Orientation: the study map, the big picture and how to study (reading) | Reading | 15 |
| 2 | 1.2 · What an information system is and how it works (reading) | Reading | 25 |
| 3 | 1.3 · Types of business information systems and why they matter (reading) | Reading | 25 |
| 4 | 1.4 · Enterprise resource planning in practice (video) | Video | 10 |
| 5 | 1.5 · Opportunities for innovation, digital business models and successful adoption (reading) | Reading | 35 |
| 6 | 1.6 · Model answers for Topic 01 (reading) | Reading | 25 |
| 7 | 1.7 · Topic 01 quiz | Quiz | 15 |

### Module 2 · BIS-02 · Topic 02 · Data Management Systems

Data, information and knowledge; data management versus database management; the seven-stage data lifecycle; data types and sources; data quality and governance controls; ETL and ELT; warehouses, lakes and BI; KPIs; big data and the data science cycle; managing data risks.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 2.1 · Data, the data management system and the data lifecycle (reading) | Reading | 30 |
| 2 | 2.2 · Data governance explained (video) | Video | 6 |
| 3 | 2.3 · ETL: extract, transform, load (video) | Video | 8 |
| 4 | 2.4 · Data quality and governance controls (reading) | Reading | 25 |
| 5 | 2.5 · Processing, analytics, KPIs and managing data risks (reading) | Reading | 30 |
| 6 | 2.6 · Data lakes and the path to analytics (video) | Video | 7 |
| 7 | 2.7 · Topic 02 quiz | Quiz | 15 |

### Module 3 · BIS-03 · Topic 03 · Development of Software for Businesses

The business problem; functional and non-functional requirements, business rules and acceptance criteria; the SDLC; Waterfall, Agile/Scrum, DevOps/CI-CD and low-code; software architecture, APIs and REST; build, buy, customise or outsource; testing and the delivery pipeline; human-centred design; why projects fail.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 3.1 · From business problem to requirements and the SDLC (reading) | Reading | 30 |
| 2 | 3.2 · Agile and Scrum in practice (video) | Video | 4 |
| 3 | 3.3 · Delivery methods, software architecture and sourcing choices (reading) | Reading | 30 |
| 4 | 3.4 · How REST APIs connect business software (video) | Video | 9 |

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 5 | 3.5 · Quality assurance, human-centred design and why projects fail (reading) | Reading | 30 |
| 6 | 3.6 · Human-centred design (video) | Video | 3 |
| 7 | 3.7 · Topic 03 quiz | Quiz | 15 |

### Module 4 · BIS-04 · Topic 04 · Database Management Systems for Businesses

Database and DBMS; keys, schema, query, index and transaction; relational design and SQL joins; normalisation (1NF–3NF) and denormalisation; ACID; relational, document, key-value and graph models; cloud databases; administration, DBMS design steps and selection.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 4.1 · DBMS concepts, relational design and SQL (reading) | Reading | 30 |
| 2 | 4.2 · Relational vs NoSQL databases (video) | Video | 6 |
| 3 | 4.3 · Tables, keys and joins in a relational database (video) | Video | 45 |
| 4 | 4.4 · Normalisation, ACID, database models and administration (reading) | Reading | 35 |
| 5 | 4.5 · Designing schemas, normalising and constraints (video) | Video | 30 |
| 6 | 4.6 · Topic 04 quiz | Quiz | 15 |
| 7 | 4.7 · Database design assignment: the distributor's sales database | Assignment / exam | 60 |

### Module 5 · BIS-05 · Topic 05 · Security of Information Systems for Businesses

The CIA triad and authentication, authorisation, accountability and non-repudiation; threats, vulnerabilities and risk; layered administrative, technical and physical controls; preventive, detective and corrective controls; risk treatment; NIST CSF 2.0; incident response, business continuity and disaster recovery; OWASP Top 10:2025; digital forensics.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 5.1 · The CIA triad (video) | Video | 12 |
| 2 | 5.2 · Security objectives, threats, vulnerabilities and risk (reading) | Reading | 25 |
| 3 | 5.3 · Layered controls, risk treatment and NIST CSF 2.0 (reading) | Reading | 25 |
| 4 | 5.4 · Building a cybersecurity framework with NIST (video) | Video | 12 |
| 5 | 5.5 · Securing business software: injection, XSS and validation (video) | Video | 45 |
| 6 | 5.6 · Incident response, continuity, OWASP Top 10:2025 and forensics (reading) | Reading | 25 |
| 7 | 5.7 · Responding to a security incident (video) | Video | 15 |
| 8 | 5.8 · Topic 05 quiz | Quiz | 15 |

### Module 6 · BIS-06 · Topic 06 · Ethics in Information Systems

Six ethical principles; surveillance, consent, bias, intellectual property, inclusion, manipulation and accountability; law versus ethics; Uganda's Data Protection and Privacy Act and the PDPO; ethical theories and Ugandan cases; OECD AI Principles and AI safeguards; the ethical decision-making checklist; sustainability.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 6.1 · Ethical principles and frequent ethical issues in business IT (reading) | Reading | 25 |
| 2 | 6.2 · Moral reasoning: consequences versus duties (video) | Video | 55 |
| 3 | 6.3 · Law versus ethics, Uganda's data protection regime and three lenses (reading) | Reading | 25 |
| 4 | 6.4 · What AI ethics means for a business (video) | Video | 7 |
| 5 | 6.5 · Responsible AI, the OECD principles and the ethical decision checklist (reading) | Reading | 25 |
| 6 | 6.6 · Topic 06 quiz | Quiz | 15 |

### Module 7 · BIS-07 · Revision Toolkit and Mock Examination

Answer-writing technique, essential distinctions, key-term glossary, twelve practice questions with answer directions, an integrated case, and a timed mock examination with marking guide.

| # | LESSON | TYPE | MINUTES |
|---|---|---|---|
| 1 | 7.1 · Answer technique, essential distinctions and glossary (reading) | Reading | 25 |
| 2 | 7.2 · Twelve practice questions with answer directions (reading) | Reading | 30 |
| 3 | 7.3 · Timed mock examination: Section A | Quiz | 25 |
| 4 | 7.4 · Integrated case: an improvement plan for a growing retailer (assignment) | Assignment / exam | 45 |
| 5 | 7.5 · Mock examination: Section B written answers (assignment) | Assignment / exam | 75 |

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