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Data Science for Managerial Decisions (MB 511)

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References/Literature

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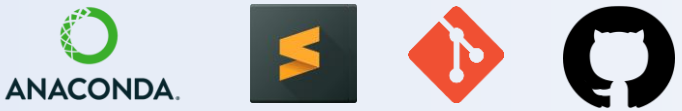
Online Resources

Software Resources



Data Science for Managerial Decisions (MB 511)

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Program Overview

- Introduction to Data Science
- Information Technology An Overview
- Applications of Data Science in various fields
- MIS and Control Systems
- Data Collection and Data Pre-Processing
- Building Information Systems
- Support Systems for Management Decisions

Information Technology An Overview

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- Foundations of Information Technology
- Information Systems and Management
- Project Management in IT
- Cybersecurity and IT Governance
- Future Trends in Information Technology

Information Technology An Overview

Project Management in IT

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Project management plays a crucial role in the field of Information Technology (IT) from a management perspective. It involves the planning, execution, and control of IT projects to achieve specific goals within defined constraints

key aspects of the role of project management in IT

- Goal Achievement
- Resource Allocation
- Risk Management
- Stakeholder Communication
- Quality Assurance
- Change Management
- Post-Implementation Review

Information Technology An Overview

Project Management in IT

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Goal Achievement

Scope Management Clearly defining the project scope helps in understanding what needs to be accomplished. It ensures that the project team and stakeholders have a common understanding of the project's objectives.

Time Management Establishing timelines and milestones is essential to ensure that the project is completed within the specified timeframe.

Resource Allocation

Human Resources Efficiently managing human resources involves assigning tasks based on skills, experience, and availability. It also includes monitoring team performance and addressing any issues that may arise during the project.

Budget Management IT projects often have budget constraints. Project management ensures that resources are allocated wisely to avoid cost overruns.

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Risk Management

Identification and Mitigation Recognizing potential risks and developing strategies to mitigate them is a crucial aspect of project management. In IT projects, risks may include technical challenges, changes in requirements, or external factors such as cybersecurity threats.

Contingency Planning Preparing for unexpected events helps in minimizing their impact on project timelines and objectives.

Stakeholder Communication

Clear Communication Project managers facilitate communication between team members and stakeholders, ensuring that everyone is informed about project progress, changes, and challenges.

Expectation Management Managing stakeholder expectations is vital. This includes setting realistic expectations regarding project outcomes, timelines, and resource requirements.

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Project Management in IT

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Quality Assurance

Testing and Validation IT projects often involve the development of software or the implementation of new technologies. Project management ensures that proper testing procedures are in place to validate the quality and functionality of the deliverables.

Compliance Ensuring that the project meets industry standards and regulatory requirements is crucial, especially in fields where data security and privacy are paramount.

Change Management

Adaptability IT projects often face changes in requirements or technology during the project lifecycle. Project management involves assessing the impact of changes, obtaining approvals, and implementing modifications while maintaining project objectives.

Post-Implementation Review

Evaluation After project completion, a post-implementation review helps in assessing the project's success, identifying lessons learned, and providing insights for future projects.

Documentation Proper documentation of the project processes, decisions, and outcomes is essential for knowledge transfer and continuous improvement.

Information Technology An Overview

Project Management Methodologies

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There are several project management methodologies used in business, each with its own set of principles, processes, and practices. The choice of methodology depends on the nature of the project, organizational preferences, and the specific requirements of the project. Here are some of the widely used project management methodologies in business

Waterfall Methodology

Sequential Approach In the waterfall model, the project progresses through a series of phases, with each phase building on the deliverables of the previous one. It follows a linear and sequential approach.

Well-Defined Requirements Suitable for projects with well-defined and stable requirements where changes are expected to be minimal.

Agile Methodology

Iterative and Incremental Agile focuses on delivering small, incremental releases of a project in short cycles. It allows for flexibility and adaptability to changing requirements.

Collaboration and Communication Emphasizes frequent communication and collaboration between cross-functional teams, including clients and stakeholders.

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Project Management Methodologies

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Scrum

Iterative Development Scrum is an Agile framework that divides the project into small, iterative cycles called sprints. It includes roles like Scrum Master, Product Owner, and the Development Team.

Daily Stand-ups Regular short meetings called daily stand-ups ensure continuous communication and alignment within the team.

Six Sigma

Process Improvement Originally developed for manufacturing, Six Sigma aims to improve process efficiency and eliminate defects. It uses statistical methods to identify and reduce variation.

DMAIC Approach Define, Measure, Analyze, Improve, and Control is a structured approach used in Six Sigma projects.

DevOps

Integration of Development and Operations DevOps is not a traditional project management methodology but a cultural and professional movement. It emphasizes collaboration and communication between development and operations teams to enhance efficiency and quality.

Continuous Delivery Aims to achieve a continuous and automated delivery pipeline for software development.

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Project Management Certifications

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Project management certifications can enhance the skills and credibility of managers in the field. Different certifications cater to various methodologies and approaches. Here are some widely recognized project management certifications for managers

- Project Management Professional (PMP)
- Certified Associate in Project Management (CAPM)
- PRINCE2 Practitioner
- Certified ScrumMaster (CSM)
- Certified Scrum Professional (CSP)
- PMI Agile Certified Practitioner (PMI-ACP)
- Certified Project Manager (CPM)
- Certification in Risk Management Assurance (CRMA)
- Certification in Project Management (CPM)
- Managing Successful Programmes (MSP)

Information Technology An Overview

Cybersecurity and IT Governance

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What is Cybersecurity

Cybersecurity is the practice of safeguarding computer systems, networks, and digital assets from unauthorized access, attacks, and damage. It encompasses a set of technologies, processes, and measures designed to protect information and ensure the confidentiality, integrity, and availability of data.

Cybersecurity involves defending against a range of threats, including malware, ransomware, phishing, and other cybercrimes. It aims to create a secure digital environment, mitigating risks associated with data breaches, identity theft, and disruption of operations. In an increasingly interconnected world, cybersecurity is critical for businesses, governments, and individuals to protect sensitive information, maintain trust, and ensure the smooth functioning of digital systems.

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Cybersecurity and IT Governance

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Introduction to Cybersecurity for Business Managers

In the contemporary business landscape, cybersecurity stands as a linchpin for success. Business managers must grasp its pivotal role in preserving the integrity of operations. Cybersecurity involves protective measures against cyber threats, safeguarding sensitive data, financial assets, and reputation.

As businesses increasingly rely on digital platforms, managers need to comprehend the potential risks, legal implications, and financial ramifications of cyberattacks. Effective cybersecurity strategies ensure not only data protection but also foster customer trust, compliance with regulations, and sustained business resilience. In a technology-driven world, business managers' understanding and prioritization of cybersecurity are instrumental in sustaining a competitive and secure business environment.

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International standards for cybersecurity

Several international standards exist to guide and establish best practices in cybersecurity. These standards are developed by various organizations to address different aspects of cybersecurity. Some prominent international standards include

- ISO/IEC 27001 Information Security Management System (ISMS)
- ISO/IEC 27002 Code of Practice for Information Security Controls
- NIST SP 800-53 Security and Privacy Controls for Federal Information Systems and Organizations
- NIST Cybersecurity Framework
- GDPR (General Data Protection Regulation)
- PCI DSS (Payment Card Industry Data Security Standard)
- CIS Critical Security Controls
- IETF RFCs (Internet Engineering Task Force Request for Comments)
- ITIL (Information Technology Infrastructure Library)
- Cybersecurity Act of the European Union

Python Libraries an Overview

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There are numerous Python libraries available for a wide range of tasks. Here's a list of some popular Python libraries along with their primary use cases:

1. NumPy:
   - Usage: Numerical computing, handling large, multi-dimensional arrays and matrices.
2. Pandas:
   - Usage: Data manipulation and analysis, working with structured data (tables, data frames).
3. Matplotlib:
   - Usage: Data visualization, creating static, animated, and interactive plots.
4. Seaborn:
   - Usage: Statistical data visualization, based on Matplotlib, provides a high-level interface.
5. Scikit-learn:
   - Usage: Machine learning library, provides simple and efficient tools for data mining and data analysis.

Python Libraries an Overview

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6. TensorFlow:

- Usage: Open-source machine learning library developed by Google, widely used for deep learning applications.

7. PyTorch:

- Usage: Open-source machine learning library developed by Facebook, particularly popular for research in deep learning.

8. Keras:

- Usage: High-level neural networks API, runs on top of TensorFlow or Theano.

Python Libraries an Overview

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9. NLTK (Natural Language Toolkit):

- Usage: Processing and analyzing human language data, particularly in the field of natural language processing.

10. Beautiful Soup:

- Usage: Web scraping library for pulling data out of HTML and XML files.

11. Requests:

- Usage: HTTP library for making requests and handling responses, commonly used for web scraping and API interactions.

12. Django:

- Usage: High-level web framework for building web applications.

13. Flask:

- Usage: Lightweight web framework for building web applications and APIs.

14. SQLAlchemy:

- Usage: SQL toolkit and Object-Relational Mapping (ORM) library for database interactions.

Python Libraries an Overview

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15. Celery:

- Usage: Distributed task queue system, often used for background task processing.

16. OpenCV:

- Usage: Computer vision library, provides tools for image and video analysis.

17. Pygame:

- Usage: Library for creating simple games and multimedia applications.

18. NetworkX:

- Usage: Library for creating, analyzing, and visualizing complex networks (graphs).

19. Scrapy:

- Usage: An open-source and collaborative web crawling framework for Python used to extract the data from websites.

20. SymPy:

- Usage: Symbolic mathematics library, used for algebraic manipulations and solving mathematical problems symbolically.

Working with Python Libraries

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Installation:

Most Python libraries can be installed using package managers like pip or conda. For example:

pip install library_name

Importing Libraries:

After installation, you need to import the library into your Python script or Jupyter notebook using the import statement.

import library_name

Alias for Libraries:

You can use an alias to refer to a library with a shorter name, making the code more concise.

import library_name as ln

Quiz and Assignment

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Dear Class your first quiz and assignment will be due as per following schedule.

- Quiz February 24, 2024 (10 AM – 1030 AM) – Link will be updated soon
- Assignment February 25, 2024 (1200 AM) - March 2, 2024 (1159 PM) - Link

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Have a question?

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