FOReSiGHT

CURRICULA ON INTELLIGENT AUTOMATION

01

ABOUT THIS DOCUMENT

This document is created under Project FOReSiGHT, by the project team.

Leading organization: The Bucharest University of Economic Studies.

It is part of our FOReSiGHT Kit for Foreseeing and Integrating Intelligent Automation (IA) Skills.

Versions in German, Italian, Croatian and Romanian may be found on the BLOCKS Platform.
https://platform.blocks.ase.ro/

The Project

Project FOReSiGHT - Flexibility and Resilience in Digital Transformation and Intelligent Automation – Advanced Skills and Tools for Academia and Entrepreneurs.

This project is developed under Erasmus+ Programme – Strategic Partnership Project Number: 2020-1-RO01-KA203-080368.

Disclaimer

FOReSiGHT is being financed by the European Union and reflects entirely the author's view.

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Co-funded by the
Erasmus+ Programme
of the European Union

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Introduction

A brief overview of the document

This document presents comprehensive curricula for Intelligent Automation (IA), a rapidly evolving field that integrates robotics with various emerging technologies to transform the efficiency of numerous processes across industries[1][2].

The curricula are designed to provide structured learning paths for different types of participants, bridge current skill gaps, and foster forward-looking activities in skills development.

They encompass a wide range of topics, from the basics of IA technologies and concepts to advanced topics such as risk management in IA, strategic development/management for IA, use cases for IA implementation, and governance of IA[3]. The curricula also address the need to bridge IA's vocabulary/dictionary gap, ensuring learners can effectively communicate and collaborate in this field.

They are designed for various program durations, including micro, short-term, and long-term programs. Each program includes a detailed description of the skills to be developed and the evaluation procedures.

The development of these curricula is informed by insights from leading consulting firms and research organizations, including Gartner[4], UiPath[5], EY[6], and Bearing Point[7], but not only. These sources provide valuable information on the latest trends and best practices in IA, which are incorporated into the curricula to ensure that they are relevant and up-to-date.

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[1] https://www.ey.com/en_gl/intelligent-automation
[2] https://www.ey.com/en_us/consulting/intelligent-automation-consulting-services
[3] https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/tmt/tmt-pdfs/ey-intelligent-automation.pdf?download
[4] https://www.advsyscon.com/blog/gartner-it-automation/
[5] https://www.uipath.com/rpa/intelligent-process-automation
[6] https://www.ey.com/en_us/consulting/intelligent-automation-consulting-services
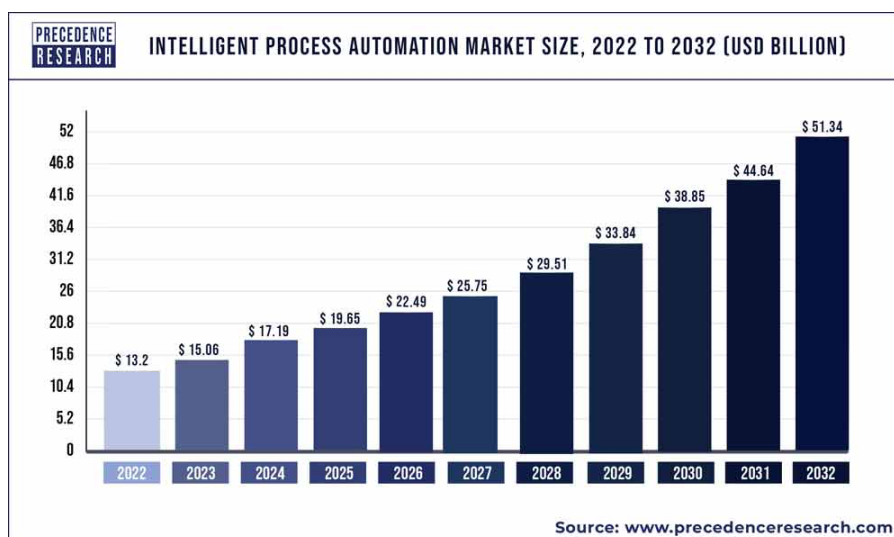[7] https://research.nelson-hall.com/search/?&avpage-views=article&id=80979&fv=1

Background and Importance of Intelligent Automation (IA)

Intelligent Automation (IA) is a transformative technology that combines the capabilities of Robotic Process Automation (RPA) and Artificial Intelligence (AI) to automate complex processes that require decision-making and learning from experience[8]. The importance of IA in today's digital age cannot be overstated. It is reshaping how businesses operate, offering unprecedented opportunities for efficiency, accuracy, and scalability. IA is not just about automating tasks but about augmenting human capabilities and freeing employees to focus on higher-value activities. It enables organizations to automate complex processes previously thought to be the exclusive domain of humans. This includes tasks that require understanding natural language, recognizing patterns, making rules-based decisions, and learning from past experiences. Nonetheless, automation may still displace 85 million jobs by 2025[9].

The impact of IA is far-reaching, spanning various industries and sectors, and its importance is proliferating. It can transform operations, customer service, IT management, and other business areas. By automating routine tasks, IA allows businesses to deliver services more efficiently and accurately, improving customer satisfaction and competitive advantage.

Moreover, IA plays a crucial role in data analysis and decision-making. It can process vast amounts of data much faster and more accurately than humans, providing valuable insights to drive strategic decision-making. IA can also learn from these data, improving its performance over time.

INTELLIGENT PROCESS AUTOMATION MARKET SIZE, 2022 TO 2032 (USD BILLION)

Source: www.precedenceresearch.com

Source: Precedence Research, 2022[10]

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[8] https://www.uipath.com/rpa/intelligent-process-automation
[9] https://www3.weforum.org/docs/WEF_Future_of_Jobs_2020.pdf
[10] https://www.precedenceresearch.com/intelligent-process-automation-market - link for 2023 report
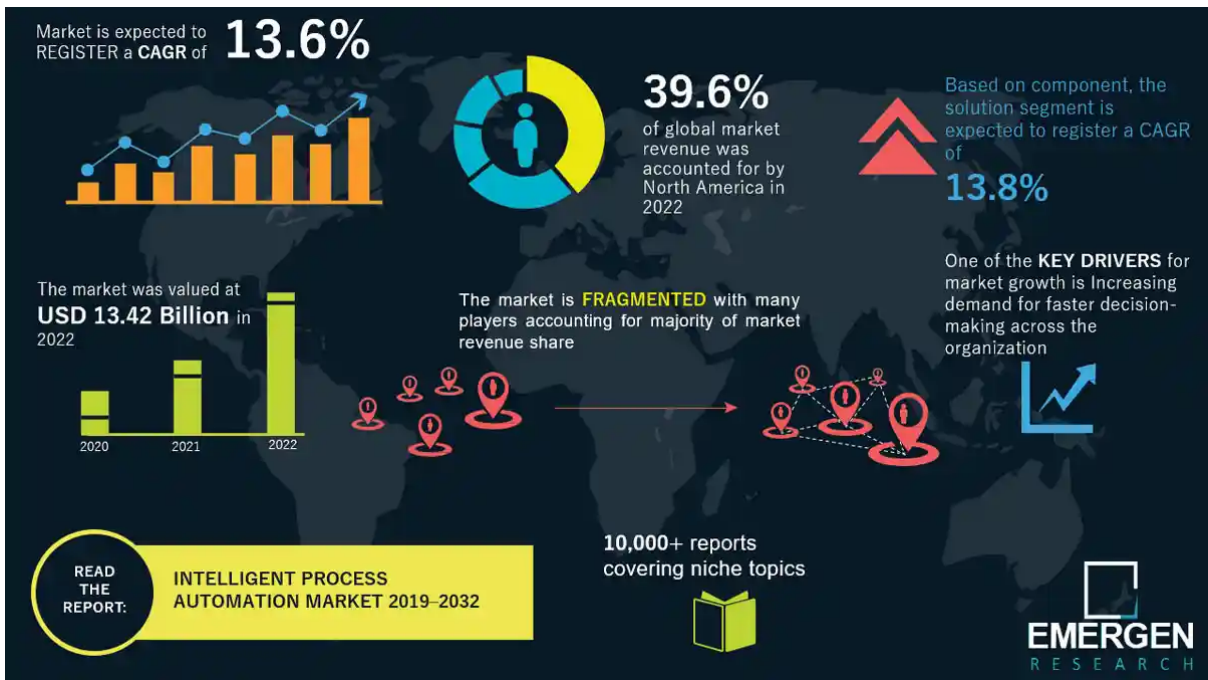
The Need for Skilled Workers in IA

The growing importance of IA is creating a demand for skilled workers in the field. The need for skilled IA workers is driven by several factors, including the increasing complexity of IA technologies, the growing number of organizations adopting IA, and the need for IA workers to have a deep understanding of both business and technology.

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[11] https://www.emergenresearch.com/industry-report/intelligent-process-automation-market
[12] https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce
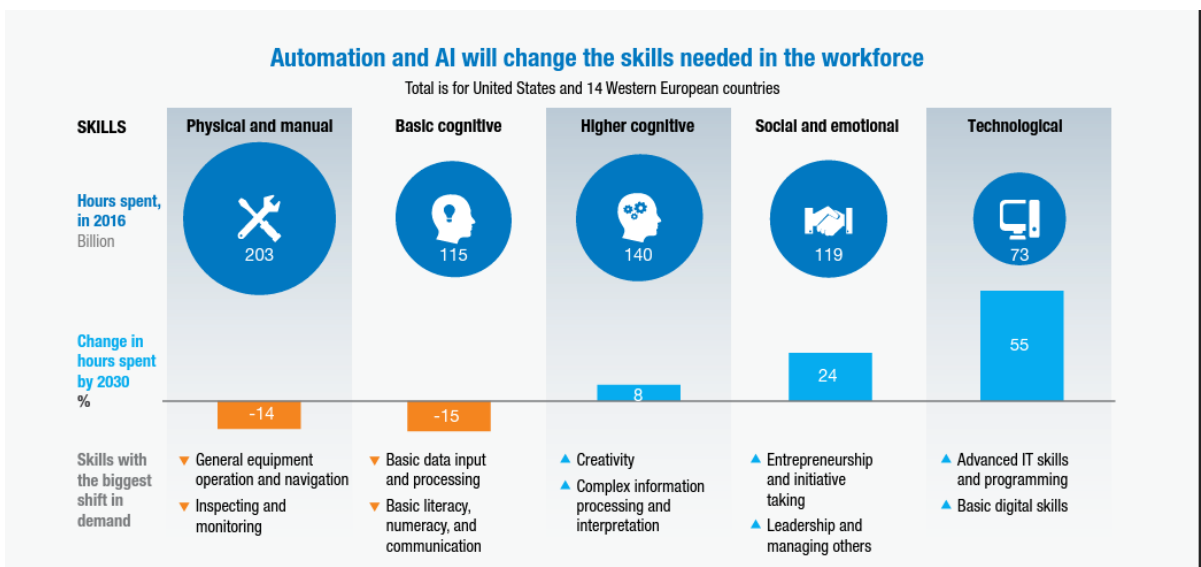
There are several challenges associated with developing skills in IA. One challenge is the rapidly changing nature of the field. IA technologies are constantly evolving, which means that IA workers need to be able to keep up with the latest trends. Another challenge is the need for more available training programs. A limited number of training programs offer comprehensive instruction in IA. This makes it difficult for people to find the training they need to develop the skills they need to be successful in the field.

HOW WORKFORCE SKILLS WILL SHIFT

MINDSET SHIFT
Instilling a culture of life-long learning and providing training opportunities for employees

ORGANIZATIONAL SET-UP
More agile corporate structures featuring less hierarchy and more collaborative team networks

"NEW COLLAR" JOBS
Activities will be reallocated between workers with different skill levels, creating a new set of middle-skill positions

WORKFORCE COMPOSITION
The booming gig economy will lead to a rise in the use of independent contractors and freelancers

C-SUITE AND HR CHANGES
Senior leadership and key functions will also need to adapt, including a change in CEO mindset and talent strategies to orchestrate the changes

Structural design changes to cope with the realities of shifting skill needs

Five options for companies to build their workforce for the future

RETRAIN
Raise skill levels of employees by teaching them new or more advanced skills

REDEPLOY
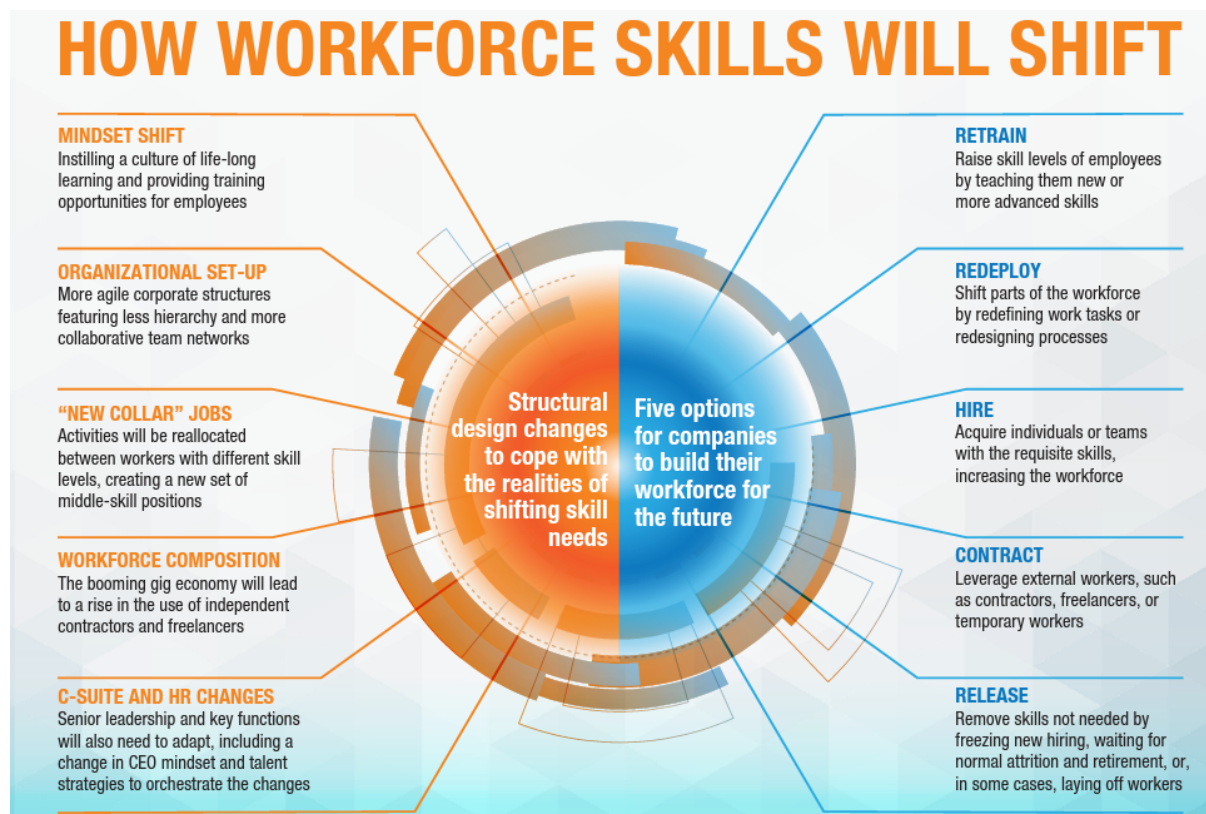Shift parts of the workforce by redefining work tasks or redesigning processes

HIRE
Acquire individuals or teams with the requisite skills, increasing the workforce

CONTRACT
Leverage external workers, such as contractors, freelancers, or temporary workers

RELEASE
Remove skills not needed by freezing new hiring, waiting for normal attrition and retirement, or, in some cases, laying off workers

Source: McKinsey, 2018[13]

The Need for a Structured Approach to Curriculum Development

Despite the significant benefits of IA, its adoption is challenging. These include the need for substantial upfront investment, the complexity of integrating IA technologies with existing systems, and the need for skills and expertise to manage and maintain these systems. Therefore, a structured approach to learning and skills development is essential to harness the full potential of IA.

The challenges associated with developing skills in IA highlight the need for a structured approach to curriculum development. A structured curriculum ensures that students are

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[13] https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce

exposed to the latest IA technologies and can develop the skills they need to succeed in the field.

In the following sections, we will delve deeper into the various aspects of IA, including its basic and advanced concepts, risk management, strategic development, use cases, and governance. We will also provide detailed curricula for various program durations, outlining the skills to be developed and the evaluation procedures to be used.

Importance of structured learning in Intelligent Automation (IA)

Intelligent Automation (IA) is complex and rapidly evolving, with new technologies, methodologies, and best practices emerging regularly. This makes it essential for individuals and organizations to engage in structured learning to understand and leverage IA effectively.

Structured learning provides a systematic approach to understanding the various components of IA, from basic concepts and technologies to more advanced topics. It allows learners to build a solid foundation of knowledge and then gradually expand on it, ensuring a comprehensive understanding of the field.

Moreover, structured learning is crucial for bridging the skills gap in IA. Many organizations need more skilled professionals to implement IA effectively. A structured learning approach can address this issue by providing clear learning paths and objectives, enabling learners to develop the necessary skills systematically and efficiently.

Structured learning also plays a key role in fostering innovation in IA. Providing a deep understanding of IA technologies and methodologies equips learners with the knowledge and skills needed to innovate and drive improvements in IA implementation.

Furthermore, structured learning is essential for ensuring IA's safe and ethical use. It can provide learners with a thorough understanding of the potential risks and ethical considerations associated with IA and equip them with the skills to manage these risks effectively.

In the following sections, we will provide detailed curricula for structured learning in IA, covering various program durations and clearly describing the skills to be developed and the evaluation procedures. These curricula are designed to provide a comprehensive and structured approach to learning in IA, ensuring that learners are well-equipped to harness the full potential of this transformative technology.

A structured curriculum on IA should include the following elements:

A foundation in the basics of IA, such as AI, machine learning, and RPA.

Instruction in advanced IA topics like natural language processing, computer vision, and predictive analytics.

Training in the use of IA tools and platforms.

Exposure to real-world IA projects.

Assessment of knowledge and skills

Goals and objectives of the curricula

The primary goal of the curricula is to provide a comprehensive, structured learning path for individuals and organizations seeking to understand and leverage Intelligent Automation (IA). The curricula aim to equip learners with the knowledge and skills necessary to navigate the complex landscape of IA, from basic concepts and technologies to more advanced topics. The curricula are designed to be flexible and adaptable, catering to various program durations and learning preferences. They provide a roadmap for learning in IA, guiding learners from the basics to more advanced topics and equipping them with the skills needed to succeed in this rapidly evolving field.

The specific objectives of the curricula are as follows:

1. **Foundational Understanding**: To provide a solid foundation of knowledge in IA, including an understanding of the basic technologies and concepts involved.

2. **Advanced Knowledge**: To delve into more advanced topics in IA, such as risk management, strategic development, use cases, and governance.

3. **Skills Development**: To help learners develop practical skills to implement and manage IA technologies effectively.

4. **Bridging the Vocabulary Gap**: To ensure that learners can effectively communicate and collaborate in the field of IA by bridging the vocabulary/dictionary gap.

5. **Risk Management**: To equip learners with the knowledge and skills to identify and manage the potential risks of IA.

6. **Innovation and Strategic Development**: To foster innovation and strategic thinking in IA, enabling learners to drive improvements in IA implementation.

7. **Ethical Considerations**: To provide learners with a thorough understanding of the ethical considerations associated with IA, promoting the safe and responsible use of IA technologies.

8. **Evaluation and Continuous Improvement**: To establish clear evaluation procedures that allow learners to assess their progress and identify areas for improvement.

Skills Developed

- Knowledge of IA technologies and concepts
- Ability to apply IA to real-world problems
- Ability to manage the risks associated with IA
- Ability to develop and implement IA strategies
- Ability to use cases for IA implementation
- Ability to govern IA

Evaluation Procedures

| Assessment of knowledge and skills | Portfolio assessment | Case study analysis | Project work |

Understanding Intelligent Automation

Basics of IA: Technologies and Concepts

Intelligent Automation (IA) is a cutting-edge field that combines traditional automation with artificial intelligence (AI) to create systems capable of performing tasks that typically require human intelligence. These tasks range from simple rule-based activities to complex processes requiring decision-making, problem-solving, and learning capabilities[14].

Two key technologies at the heart of IA are Robotic Process Automation (RPA) and Artificial Intelligence (AI).
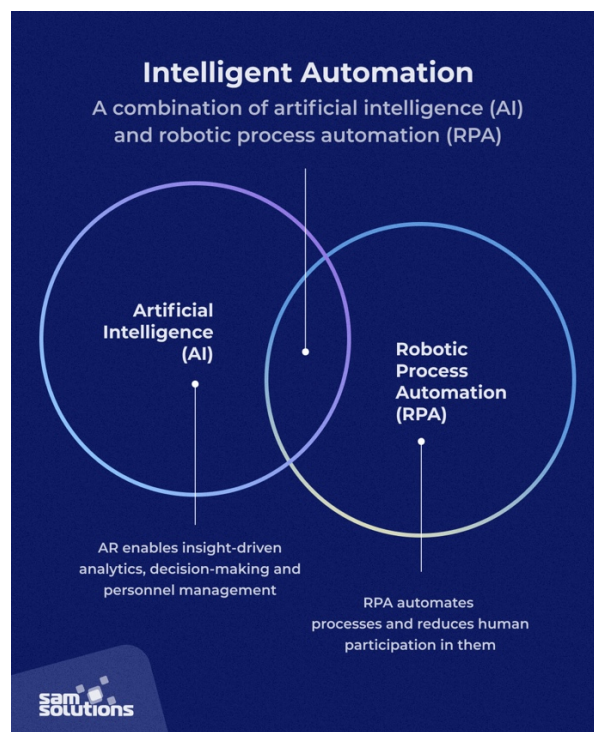
Robotic Process Automation (RPA) is a technology that uses software robots or 'bots' to automate repetitive, rule-based tasks. These bots can interact with digital systems and software just like a human user, performing tasks such as data entry, processing transactions, and responding to simple customer service queries[16].

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[14] https://www.gartner.com/en/information-technology/glossary/robotic-process-automation-rpa
[15] https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce
[16] https://www.uipath.com/rpa/robotic-process-automation

Artificial Intelligence (AI), on the other hand, refers to a set of technologies that enable machines to mimic human intelligence. This includes machine learning (where machines can learn from experience), natural language processing (where machines can understand and generate human language), and computer vision (where machines can interpret visual information)[17]. Artificial intelligence (AI) may also be categorized into three types:

- Artificial Narrow Intelligence (ANI)
- Artificial General Intelligence (AGI)
- Artificial Super Intelligence (ASI)
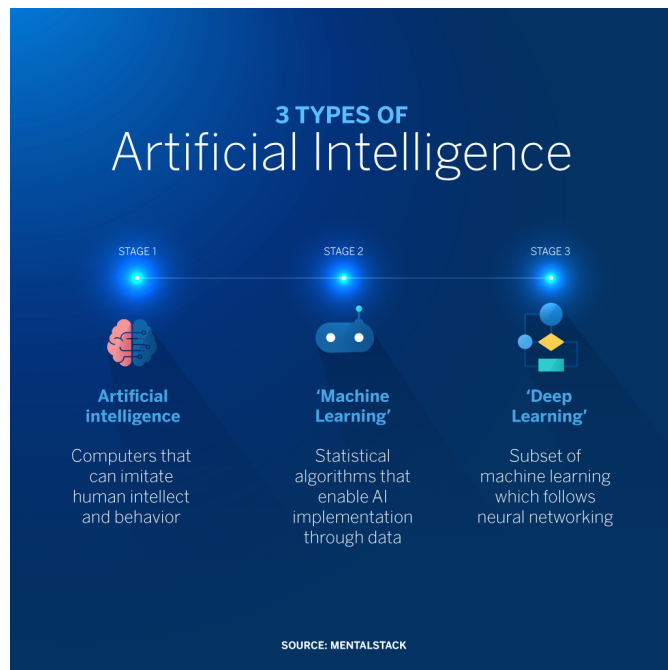
Source: MentalStack by BBVA, 2023[18]

When combined, RPA and AI create Intelligent Automation systems that can perform repetitive tasks, learn from experience, adapt to new situations, and make decisions based on complex rules and patterns. This makes IA a powerful tool for improving efficiency, reducing errors, and freeing human workers to focus on more strategic, creative tasks[19].

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[17] https://www.mckinsey.com/capabilities/quantumblack/our-insights/an-executives-guide-to-ai
[18] https://www.bbvaopenmind.com/en/technology/artificial-intelligence/intellectual-abilities-of-artificial-intelligence/
[19] https://www.ey.com/en_ro/intelligent-automation

ARTIFICIAL INTELLIGENCE VS
MACHINE LEARNING VS DEEP LEARNING

❶ Artificial Intelligence

Development of smart systems and machines that can carry
out tasks that typically require human intelligence

❷ Machine Learning

Creates algorithms that can learn from data and
make decisions based on patterns observed
Require human intervention when decision is incorrect

❸ Deep Learning

Uses an artificial neural
network to reach accurate
conclusions without human
intervention

Source: SCS, 2020[20]

The concept of IA also extends to include other technologies, such as chatbots, virtual agents, and intelligent document processing, which use AI to interact with users, answer queries, and process unstructured data[21].

Advantages and Disadvantages
of Intelligent Automation

✓
- Efficient use of equipment and manpower
- Increased effectiveness
- Lower costs and high ROI
- Seamless customer experience
- Enhanced cybersecurity
- Focus on critical issues rather than on mundane work

✗
- Establishing a robust governance
- Creating a proper IT environment and technological ecosystem
- Developing the implementation strategy and choosing the right tools
- Restructuring the existing system and retraining employees
- Teaching necessary metrics and assigning tasks to it
- Managing risks

Source: SAM Solutions, 2023[22]

[20] https://www.scs.org.sg/articles/machine-learning-vs-deep-learning
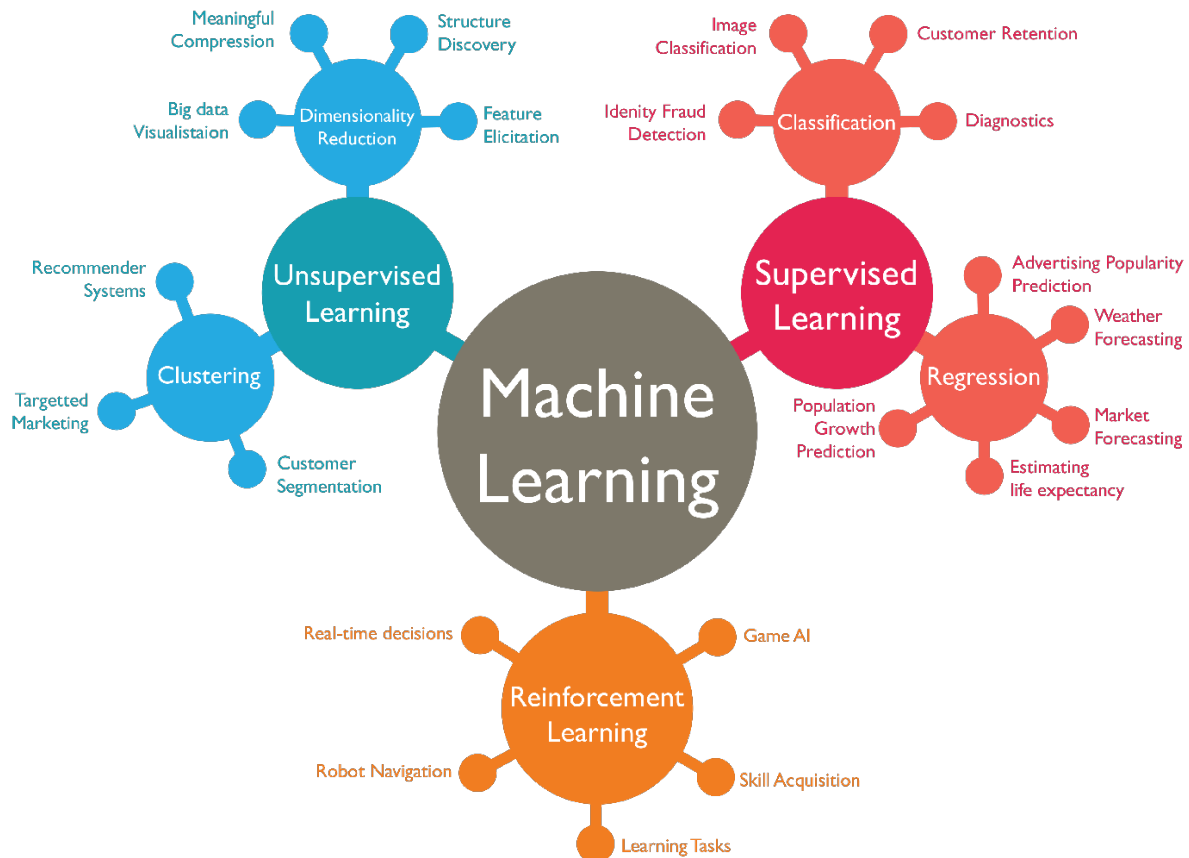[21] https://www.bearingpoint.com/en/services/technology/data-analytics-ai/
[22] https://www.mckinsey.com/featured-insights/future-of-work/skill-shift-automation-and-the-future-of-the-workforce

Advanced IA: Technologies and Concepts

As we delve deeper into the realm of Intelligent Automation (IA), we encounter more advanced technologies and concepts that extend beyond the foundational elements of Robotic Process Automation (RPA) and basic Artificial Intelligence (AI). These advanced elements of IA enable more complex tasks to be automated and allow for greater adaptability and learning capabilities[23].

One such advanced technology is **Machine Learning (ML)**, a subset of AI that enables machines to learn from data without being explicitly programmed. ML algorithms can identify patterns in large datasets and make predictions or decisions based on these patterns. This technology is instrumental in IA for tasks such as predictive maintenance, fraud detection, and customer segmentation[24].

Source: WordStream, 2021[25]

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[23] https://www.gartner.com/en/information-technology/glossary/robotic-process-automation-rpa

[24] https://www.mckinsey.com/capabilities/quantumblack/our-insights/an-executives-guide-to-ai

[25] https://www.wordstream.com/blog/ws/2017/07/28/machine-learning-applications

Natural Language Processing (NLP) is another advanced AI technology often used in IA. NLP enables machines to understand and generate human language, allowing them to interact with users more naturally and intuitively. This technology is commonly used in chatbots and virtual assistants, which can understand user queries and provide relevant responses[26]. Learn more about NLP at DeepLearning.ai[27]

Cognitive Automation, another advanced concept in IA, refers to systems that can handle unstructured data (such as text, images, and voice) and make decisions based on this data. These systems use a combination of ML, NLP, and other AI technologies to mimic human cognition, enabling them to perform tasks such as document analysis, sentiment analysis, and even medical diagnosis[28].

	RPA	Cognitive Automation
Purpose	To automate mundane, everyday tasks	To bring AI and ML technology into the automation workflow and assist humans in decision-making
Type	Process-oriented	Knowledge-based
Automation Level	Simple day-to-day tasks	More complex tasks
ROI Time	Almost immediate	Takes time
Technical Skills	Uses basic technologies such as screen mapping, automation, etc.	Uses advanced technologies such as NLP, data mining, semantic analysis, etc.
Human Intervention	Requires human intervention for handling exceptions	Can handle exceptions on its own and requires no human intervention
Use Cases	Data entry, claims processing, resume scanning, order processing.	Trend analysis, customer service interactions, behavioral analysis, email automation, etc.

Source: ApexOn, 2021[29]

Process Mining is a technique used in IA to discover, monitor, and improve actual processes by extracting knowledge from event logs readily available in today's information systems[30]. This technique allows organizations to gain insights into their operations and identify opportunities for automation.

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[26] https://forum.uipath.com/t/nlp-implementation-through-uipath/147925
[27] https://www.deeplearning.ai/resources/natural-language-processing/
[28] https://www.techtarget.com/searchcio/definition/cognitive-automation
[29] https://www.apexon.com/blog/rpa-vs-cognitive-automation-what-you-need-to-know/
[30] https://www.bearingpoint.com/en-ie/insights-events/insights/process-mining/

What is Process Mining?
Application of data analytics tools and concepts to improve workflows
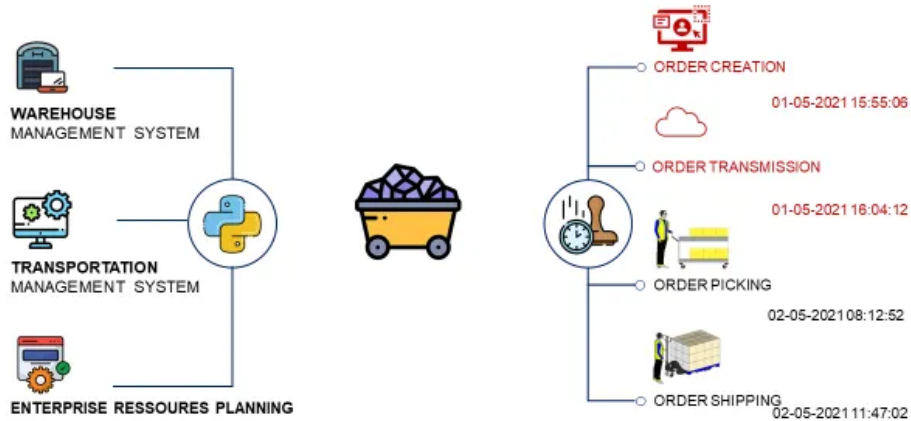
Intelligent Document Processing (IDP) is an advanced application of IA that involves extracting and processing information from unstructured documents. IDP solutions use a combination of OCR (Optical Character Recognition), ML, and NLP to convert unstructured data into a structured format that can be used for further analysis or processing[32].

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[31] https://towardsdatascience.com/what-is-process-mining-683b5eb6547c

[32] https://www.uipath.com/product/document-understanding

[33] https://www.altexsoft.com/blog/intelligent-document-processing/
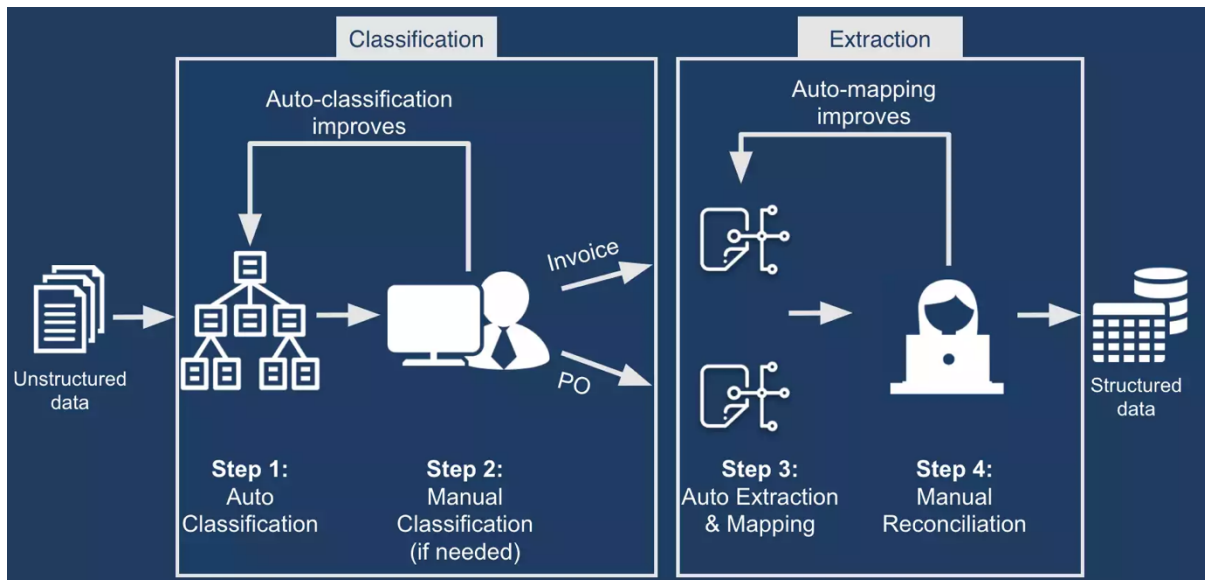
Bridging the Vocabulary/Dictionary Gap in IA

As with any specialized field, Intelligent Automation (IA) comes with its own set of terminologies and jargon. Understanding these terms is crucial for effective communication and collaboration within the area. However, the rapid evolution of IA technologies and the diversity of disciplines involved can often lead to a "vocabulary gap," where different stakeholders may use other terms to refer to the same concept or the same word to refer to different concepts.

Bridging this vocabulary gap is an essential aspect of learning in IA. It involves learning the definitions of key terms and understanding their context and how they are used in practice. This can help to ensure clear communication, reduce misunderstandings, and facilitate effective collaboration among IA professionals.

Some of the key terms in IA include:

Robotic Process Automation (RPA)	The use of software robots to automate repetitive, rule-based tasks.
Artificial Intelligence (AI)	A set of technologies that enable machines to mimic human intelligence.
Machine Learning (ML)	A subset of AI that enables machines to learn from data without being explicitly programmed.
Natural Language Processing (NLP)	An AI technology that enables machines to understand and generate human language.
Cognitive Automation	Systems that can handle unstructured data and make decisions based on this data.
Process Mining	A technique used to discover, monitor, and improve real processes by extracting knowledge from event logs.
Intelligent Document Processing (IDP)	The extraction and processing of information from unstructured documents using a combination of OCR, ML, and NLP.

Curriculum Development for Intelligent Automation

Approach to Curriculum Development

Developing a curriculum for Intelligent Automation (IA) requires a systematic and thoughtful approach. The goal is to create a comprehensive learning path that covers the key concepts and technologies in IA and addresses the practical skills needed to implement and manage IA systems effectively. Notably, the curriculum also integrates aspects related to resilience and foresight, preparing learners to adapt to changes and anticipate future trends in the field of IA.

The following principles guide our approach to curriculum development for IA:

1. **Learner-Centered**: The curriculum is designed with the learner at the center. It considers the diverse backgrounds and learning needs of the learners and provides flexible learning paths that cater to different learning styles and paces.

2. **Comprehensive**: The curriculum covers a wide range of topics in IA, from basic concepts and technologies to more advanced topics such as risk management, strategic development, and governance. It also addresses the need to bridge the vocabulary gap in IA, ensuring that learners can effectively communicate and collaborate in this field[34].

3. **Resilience and Foresight**: The curriculum integrates aspects related to resilience and foresight, equipping learners with the skills to adapt to changes and anticipate future trends in IA. This includes understanding the potential risks and challenges in IA and developing strategies to mitigate these risks and seize new opportunities[35].

4. **Practical**: The curriculum emphasizes practical skills and applications of IA. It includes hands-on exercises and projects that allow learners to apply what they have learned in real-world contexts. It also provides case studies and examples from various industries to illustrate the practical applications of IA[36][37].

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[34] https://venturebeat.com/virtual/meeting-the-challenge-of-skill-gaps-in-the-age-of-digital-transformation/
[35] https://www.ey.com/en_be/workforce/the-ever-growing-importance-of-l-d-in-the-future-of-work
[36] https://www.mckinsey.com/~/media/mckinsey/industries/education/our%20insights/the%20skills%20revolution%20and%20the%20future%20of%20learning%20and%20earning/the-skills-revolution-and-the-future-of-learning-and-earning-report-f.pdf
[37] https://www.bearingpoint.com/en/insights-events/insights/the-war-for-talent/

5. **Up-to-Date**: The curriculum is regularly updated to reflect the latest trends and developments in IA. It draws on insights from leading consulting firms and research organizations.

6. **Assessment and Evaluation**: The curriculum includes clear evaluation procedures that allow learners to assess their progress and identify areas for improvement. These may include quizzes, assignments, projects, and exams.

7. **Collaboration and Networking**: The curriculum encourages collaboration and networking among learners. This can be facilitated through group projects, discussion forums, and networking events.

Bridging the gap in current skills

One of the key objectives of the Intelligent Automation (IA) curriculum is to bridge the gaps in current skills. As the field of IA continues to evolve, new skills are constantly emerging while others are becoming obsolete. This dynamic nature of the field can often lead to a skills gap, where the skills possessed by individuals and organizations do not match the skills needed to implement and manage IA systems effectively.

To address this issue, the curriculum includes a comprehensive assessment of current skills and identifies areas where improvement is needed. This assessment is based on the latest research and insights from leading consulting firms and research organizations.

The curriculum then provides targeted learning paths to bridge these skills gaps. These learning paths cover a wide range of topics in IA, from basic concepts and technologies to more advanced topics such as risk management, strategic development, and governance. They also include practical exercises and projects that allow learners to apply their new skills in real-world contexts.

In addition to bridging the gaps in current skills, the curriculum also aims to equip learners with the resilience and foresight needed to adapt to changes and anticipate future trends in IA. This includes understanding the potential risks and challenges in IA, developing strategies to mitigate them, and seizing new opportunities.

By bridging the gaps in current skills and fostering resilience and foresight, the curriculum aims to prepare learners for the future of IA. It equips them with the knowledge and skills they need to navigate the complex landscape of IA and empowers them to drive improvements in IA implementation and management.

Integrating various IA topics into a cohesive curriculum is critical to learning. The curriculum is designed to provide a comprehensive understanding of IA, covering various topics from basic to advanced levels. These topics are not taught in isolation but are integrated to allow learners to understand how they relate to each other and the broader field of IA.

The curriculum begins with foundational topics, such as the basics of IA technologies and concepts, which provide the groundwork for understanding more advanced topics. These foundational topics include Robotic Process Automation (RPA), Artificial Intelligence (AI), and the key terminologies used in IA.

Building on this foundation, the curriculum then delves into more advanced topics such as Machine Learning (ML), Natural Language Processing (NLP), Cognitive Automation, Process Mining, and Intelligent Document Processing (IDP). These topics are integrated to allow learners to see how they interrelate and contribute to the overall field of IA.

The curriculum also integrates topics related to the practical implementation and management of IA systems. These include risk management in IA, strategic development and management for IA, use cases for IA implementation, and governance of IA. These topics are crucial for understanding the technical aspects of IA and the strategic and operational considerations involved in implementing and managing IA systems.

In addition to these technical and practical topics, the curriculum also integrates aspects of resilience and foresight. This includes understanding the potential risks and challenges in IA, developing strategies to mitigate these risks, and anticipating future trends in IA. Integrating resilience and foresight into the curriculum prepares learners to adapt to changes and seize new opportunities in the rapidly evolving field of IA.

Through this integrated approach, the curriculum provides a comprehensive and cohesive learning journey that equips learners with the knowledge and skills they need to succeed in the field of IA.

Forward-Looking Activities in Skills Development

In the rapidly evolving field of Intelligent Automation (IA), more than acquiring current skills is required. Learners must also be prepared to continuously develop new skills and adapt to future trends and changes in the field. This requires a forward-looking approach to skills development, a key component of our IA curriculum.

The curriculum includes several forward-looking activities to foster this continuous learning and adaptation. These activities include:

1. **Foresight Exercises**: These exercises encourage learners to anticipate future trends and developments in IA. They may involve analyzing current trends, predicting developments, and discussing their potential implications for IA.

2. **Scenario Planning**: This involves creating and analyzing different scenarios of how the field of IA might evolve. This can help learners to develop strategies for adapting to different potential futures.

3. **Continuous Learning Modules**: The curriculum includes regularly updated modules to reflect the latest trends and developments in IA. These modules allow learners to stay up-to-date with the latest knowledge and skills in the field.

4. **Resilience Training**: This involves developing the ability to adapt to changes and overcome challenges in IA. This includes understanding potential risks and challenges in IA, developing strategies to mitigate these risks, and building resilience to cope with changes and setbacks.

5. **Innovation Projects**: These projects encourage learners to innovatively apply their knowledge and skills. This can involve developing new IA solutions, improving existing ones, or finding new applications for IA technologies.

Through these forward-looking activities, the curriculum aims to equip learners with the skills and mindset they need to navigate the future of IA. It fosters a culture of continuous learning and adaptation, preparing learners to seize new opportunities and overcome challenges in the rapidly evolving field of IA.

Process of Curriculum Development

Developing a curriculum for Intelligent Automation (IA) is a systematic and iterative process involving several key steps. These steps are designed to ensure that the curriculum is comprehensive, relevant, and aligned with the needs of learners and the evolving field of IA[38].

1. **Needs Assessment**: The first step in the curriculum development process is to conduct a needs assessment. This involves identifying the knowledge and skills that

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[38] https://www.aect.org/docs/AECTstandards2012.pdf

learners need to succeed in the field of IA. This step was already done in the project FOReSiGHT prior to its implementation, [39] with the following results:

1. Why IA? Intelligent Automation is still a relatively new topic that has only recently been used in the industry. While broadly means combining Robotic Process Automation (RPA) with Artificial Intelligence (AI), the latter becomes a priority for CIOs only after RPA has proven its value. Moreover, throughout the project FOReSiGHT, AI became a buzzword with the appearance of ChatGPT and its successors; therefore, interest rose tremendously in the topic. This research provided an Intelligent Automation (IA) framework based on four main strategy pillars: invest, experiment, maintain, and divest. Each identified IA technology was briefly assessed using literature on large orgs that work partially or fully with the identified technologies. Intelligent Automation (IA) means achieving end-to-end automation by combining proven technologies like Robotic Process Automation (RPA) with new ones, like Chatbots, Process Mining, Data Mining, or Intelligent Optical Character Recognition (IOCR). While the RPA market is on pace to total $2.4 billion in 2022, with banks, insurance companies, utilities, and telecommunications companies as leading adopters, Gartner states that other technologies are incumbent. New technologies require skilled people to code and implement the software. We are facing a time when large organizations are building their internal capabilities - also known as a "Center of Excellence," through which they assess, train, and deliver basic automation throughout the organization. In this context, getting the right skills in the organization will mean its digitalization and survival. Therefore, there is a direct link between business and community resilience, and IA, and the novelty of the tech concepts and models and potential linkages to business are still streamlining the merging of dictionaries between specialists.

2. **Learning Objectives**: Based on the needs assessment, clear and measurable learning objectives are defined for the curriculum. These objectives guide the development of the curriculum and provide a benchmark for evaluating its effectiveness[40].

3. **Content Development**: The next step is to develop the curriculum content. This involves selecting and organizing the topics to be covered and creating learning materials such as lectures, readings, exercises, and projects. The content is

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[39] https://www.td.org/atd-blog/the-what-why-and-how-of-needs-assessments
[40] https://cft.vanderbilt.edu/guides-sub-pages/blooms-taxonomy/

designed to be comprehensive, covering a wide range of topics from basic to advanced levels and integrating aspects related to resilience and foresight.[41].

4. **Instructional Design**: The curriculum is then structured to facilitate effective learning. This involves deciding on the sequence of topics, the teaching methods, and the balance between theoretical and practical learning. The learner-centered design provides flexible learning paths that cater to different learning styles and paces[42].

5. **Evaluation and Assessment**: The curriculum includes clear evaluation and assessment procedures. These procedures allow learners to assess their progress, identify areas for improvement, and receive feedback on their performance.[43].

6. **Review and Update**: The curriculum should be regularly reviewed and updated to remain relevant and up-to-date. This involves monitoring changes in the field of IA, gathering feedback from learners and instructors, and making necessary adjustments to the curriculum.[44]. Throughout project FOReSiGHT, the curricula were reviewed in four separate waves of the modified Agile methodology of project implementation.

Through this systematic and iterative process, the curriculum for IA is designed to provide a comprehensive, relevant, and effective learning experience. It equips learners with the knowledge and skills they need to succeed in the rapidly evolving field of IA and fosters a culture of continuous learning and adaptation.

Purpose and Overview of the Curricula

The purpose of the Intelligent Automation (IA) curricula is multifaceted, designed to address the diverse needs of its participants and the evolving landscape of IA. The curricula aim to:

1. **Bridge the Skills Gap**: The curricula are designed to address the current skills gap in IA. They provide comprehensive training in basic and advanced IA technologies

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[41] Morrison, G. R., Ross, S. M., Kalman, H. K., & Kemp, J. E. (2010). Designing effective instruction. John Wiley & Sons. - https://www.wiley.com/en-ae/Designing+Effective+Instruction%2C+8th+Edition-p-9781119465980

[42] https://www.umsl.edu/~henschkej/andragogy_articles_added_04_06/groleau_Andragogy_in_Action.pdf

[43] Suskie, L. (2009). Assessing student learning: A common sense guide. John Wiley & Sons. https://www.wiley.com/en-us/Assessing+Student+Learning%3A+A+Common+Sense+Guide%2C+3rd+Edition-p-9781119426936

[44] Dick, W., Carey, L., & Carey, J. O. (2009). The systematic design of instruction. Pearson. https://www.pearson.com/en-us/subject-catalog/p/systematic-design-of-instruction-the/P200000000952/9780137510344

and concepts, equipping participants with the knowledge and skills they need to succeed in the field.

2. **Promote Continuous Learning**: The curricula foster a culture of continuous learning. They include forward-looking activities in skills development, such as foresight exercises and continuous learning modules, which encourage participants to stay up-to-date with the latest trends and developments in IA.

3. **Integrate Resilience and Foresight**: The curricula integrate aspects related to resilience and foresight. They equip participants with the ability to adapt to changes, overcome challenges, and anticipate future trends in IA.

4. **Prepare for Practical Implementation**: The curricula prepare participants for implementing and managing IA systems. They cover topics such as risk management in IA, strategic development and management for IA, use cases for IA implementation, and governance of IA.

5. **Bridge the Vocabulary/Dictionary Gap**: The curricula aim to bridge the vocabulary/dictionary gap in IA. They provide a common language and understanding of IA, facilitating communication and collaboration among participants from different backgrounds.

6. **Cater to Diverse Participants**: The curricula cater to a diverse range of participants, including students, teachers, trainers, entrepreneurs, professionals, and experts. They provide flexible learning paths that cater to different learning styles and paces.

Through these purposes, the IA curricula aim to equip participants with the knowledge and skills they need to succeed in the rapidly evolving field of IA, foster a culture of continuous learning and adaptation, and contribute to the broader development of the IA field.

The Intelligent Automation (IA) curricula are structured to cater to various learning needs and durations. They are designed to provide comprehensive, flexible, and forward-looking learning experiences. The curricula are divided into three main program durations: Micro Program, Short Term, and Long Term.

Structure of the Curricula: The curricula are structured around key topics in IA, including basic and advanced IA technologies and concepts, risk management in IA, strategic development and management for IA, use cases for IA implementation, and governance. Each topic is covered in depth, balancing theoretical knowledge and practical application. The curricula also integrate aspects of resilience and foresight, preparing participants to adapt to changes and anticipate future trends in IA.

Micro Programs:

The Micro Program is designed for learners who want to understand IA or update their knowledge on specific topics quickly. It consists of short courses that can be completed in a few hours or days. The Micro Program covers the basics of IA and provides an overview of key topics. It is ideal for professionals who want to stay up-to-date with the latest trends in IA, or for beginners who want to get a taste of what IA is all about.

Short-Term Programs:

The Short-Term Program is designed for learners who want to understand IA more deeply. It consists of courses that can be completed in a few weeks or months. The Short-Term Program covers both basic and advanced IA topics and includes practical exercises and projects. It is ideal for professionals who want to enhance their skills in IA or for students who want to supplement their studies with practical IA knowledge.

Long-Term Programs:

The Long-Term Program is designed for learners who want to understand IA comprehensively. It consists of courses that can be completed in a few months or a year. The Long Term Program covers all aspects of IA in-depth and includes a capstone project allowing learners to apply their knowledge in the real world. It is ideal for professionals who want to specialize in IA or for students who want to pursue a career in IA.

The IA curricula cater to a wide range of learning needs and objectives through these different program durations. They provide flexible learning paths that allow learners to choose the level of depth and duration that suits their needs.

Examples of Learning paths for Intelligent automation

The concept of 'learning paths' has gained significant traction in education and professional development. A learning path is a sequential and curated set of educational resources or courses designed to guide learners toward a specific learning goal or competency[45].

Learning paths are typically structured to allow learners to progress from foundational knowledge to more advanced concepts, ensuring a comprehensive understanding of the subject matter. They are often personalized to cater to each learner's unique learning needs and pace, thereby enhancing the effectiveness of the learning process[46].

Learning paths are rooted in the understanding that learning is not a one-size-fits-all process. Different learners have different learning styles, prior knowledge, and objectives. By providing a structured and personalized learning journey, learning paths enable learners to acquire knowledge and skills in a manner that is most effective for them[47].

Moreover, learning paths are about more than just the content. They also encompass assessments, feedback mechanisms, and opportunities for practical application, providing a holistic learning experience. They are often integrated with learning management systems, enabling tracking of learner progress and performance[48].

Learning paths represent a strategic and learner-centric approach to education and professional development. They provide a roadmap for learners to achieve their learning goals, enhancing the efficiency and effectiveness of the learning process[49].

We included our curricula and study materials in specific learning paths, as listed below.

Apart from these learning paths, we are providing in the next sections, specific curricula for micro-programs, short-term programs, and long-term programs for managers (graduate studies), business students (undergraduate and graduate studies), non-tech students (undergraduate studies) and entrepreneurs (life-long-learning courses).

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[45] https://www.learnupon.com/blog/learning-paths-walkthrough/
[46] https://www.instancy.com/what-are-the-10-essentials-to-a-learning-path/
[47] https://www.learnupon.com/blog/learning-paths-walkthrough/
[48] https://www.instancy.com/what-are-the-10-essentials-to-a-learning-path/
[49] https://www.learnupon.com/blog/learning-paths-walkthrough/

Audience	Topics	Objectives/Goals	Course Modules	Content Types	Duration	Assessment & Feedback	Certification
Managers	Intelligent Automation	- Understand IA principles - Lead IA integration - Optimize business processes	1. IA Basics 2. IA & Leadership 3. Case Studies 4. Best Practices	E-Learning, Webinars, Case Studies	2 Months	Quizzes, Project, Survey, Feedback Sessions	IA Management Certificate
Business Students	Intelligent Automation	- Understand IA principles - Apply IA in business scenarios - Analyze IA impact on businesses	1. Introduction to IA 2. IA Applications 3. IA & Business Strategy 4. Real-world Examples	E-Learning, Workshops, Case Studies	1 Semester	Midterm, Final Exam, Group Projects, Class Discussions	Course Completion Certificate
Tech Students	Intelligent Automation	- Grasp IA principles - Develop IA tools & solutions - Analyze automation algorithms	1. IA Concepts 2. Automation Tools 3. Algorithms & IA 4. IA Project	E-Learning, Labs, Workshops, Project	1 Semester	Midterm, Final Exam, Project, Code Reviews	Course Completion Certificate
Non-Tech Students	Intelligent Automation	- Understand IA concepts - Grasp the impact of IA on society - Evaluate ethical considerations	1. IA Fundamentals 2. IA & Society 3. Ethics in IA 4. Discussion & Case Studies	E-Learning, Discussions, Case Studies	1 Semester	Midterm, Final Exam, Group Discussions, Essays	Course Completion Certificate
Entrepreneurs	Intelligent Automation	- Grasp IA principles - Implement IA in startups - Optimize IA for business growth	1. IA Basics 2. IA & Startups 3. Optimizing IA 4. Case Studies & Best Practices	E-Learning, Webinars, Case Studies	3 Months	Quizzes, Project, Survey, Feedback Sessions	IA for Entrepreneurs Certificate

Curricula on Intelligent Automation

Curriculum 1: Microprogram on Intelligent Automation for Managers

Course Description:
This intensive one-week microprogram is designed to give managers a comprehensive understanding of Intelligent Automation (IA). The course will cover the basics of IA, including its technologies and concepts and its strategic applications in business management. The course will also explore the role of managers in implementing IA and managing its risks and challenges.

Learning Outcomes:
Upon completion of this microprogram, participants will be able to:
1. Understand the fundamental technologies and concepts of IA.
2. Identify the potential applications of IA in their business operations.
3. Develop strategies for the effective implementation of IA.
4. Manage the risks and challenges associated with IA.
5. Lead and manage teams in an IA-driven environment.

Course Content:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance business operations and performance.
3. Strategic Implementation of IA: Development of strategies for effectively implementing IA.
4. Risk Management in IA: Identifying and managing the risks and challenges associated with IA.
5. Leadership and Management in an IA-Driven Environment: Exploration of the role of managers in leading and managing teams in an IA-driven environment.

Evaluation Procedures:
The evaluation for this microprogram will be based on:
1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (40%): Participants must complete assignments demonstrating their understanding of the course content.
3. Final Project (40%): Participants must develop a strategic plan for implementing IA in a business scenario. The plan should demonstrate their understanding of IA and

its strategic applications, as well as their ability to manage the risks and challenges associated with IA.

Curriculum 2: Short-Term Program on Intelligent Automation for Managers

Course Description:

This 90-hour short-term program is designed to give managers an in-depth understanding of Intelligent Automation (IA). The course will cover the fundamentals of IA, its advanced technologies and concepts, and its strategic applications in business management. The course will also explore the role of managers in implementing IA, managing its risks, and leading in an IA-driven environment.

Learning Outcomes:

Upon completion of this short-term program, participants will be able to:
1. Understand the fundamental and advanced technologies and concepts of IA.
2. Identify and evaluate the potential applications of IA in their business operations.
3. Develop and implement strategies for the effective use of IA.
4. Manage the risks and challenges associated with IA.
5. Lead and manage teams in an IA-driven environment.
6. Understand and apply the principles of governance in IA.

Course Content:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Advanced IA Technologies and Concepts: In-depth exploration of advanced IA technologies and concepts.
3. Applications of IA in Business: Identifying and evaluating how IA can enhance business operations and performance.
4. Strategic Implementation of IA: Developing and implementing strategies for effectively using IA.
5. Risk Management in IA: Identifying and managing the risks and challenges associated with IA.
6. Leadership and Management in an IA-Driven Environment: Exploration of the role of managers in leading and managing teams in an IA-driven environment.
7. Governance of IA: Understanding and application of the principles of governance in IA.

Evaluation Procedures:

The evaluation for this short-term program will be based on:
1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Participants must complete assignments demonstrating their understanding of the course content.

3. Midterm Exam (20%): A midterm exam will be conducted to assess the participants' understanding of the fundamental and advanced technologies and concepts of IA.
4. Final Project (30%): Participants must develop a strategic plan for implementing IA in a business scenario. The plan should demonstrate their understanding of IA and its strategic applications, their ability to manage the risks and challenges associated with IA, and their understanding of the principles of governance in IA.

Curriculum 3: Long-Term Program on Intelligent Automation for Managers

Course Description:

This long-term program, spanning two semesters with five courses per semester, is designed to provide managers with a comprehensive and in-depth understanding of Intelligent Automation (IA). The course will cover the fundamentals and advanced aspects of IA, its strategic applications in business management, and the role of managers in implementing IA, managing its risks, and leading in an IA-driven environment. The program also integrates aspects of resilience and foresight, preparing participants to adapt to changes and anticipate future trends in IA.

Learning Outcomes:

Upon completion of this long-term program, participants will be able to:

1. Understand the fundamental and advanced technologies and concepts of IA.
2. Identify and evaluate the potential applications of IA in their business operations.
3. Develop and implement strategies for the effective use of IA.
4. Manage the risks and challenges associated with IA.
5. Lead and manage teams in an IA-driven environment.
6. Understand and apply the principles of governance in IA.
7. Demonstrate resilience and foresight in the face of changes and future trends in IA.

Course Content:

The program is divided into two semesters, each consisting of five courses.

Semester 1:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Advanced IA Technologies and Concepts: In-depth exploration of advanced IA technologies and concepts.
3. Applications of IA in Business: Identifying and evaluating how IA can enhance business operations and performance.
4. Strategic Implementation of IA: Developing and implementing strategies for effectively using IA.
5. Risk Management in IA: Identifying and managing the risks and challenges associated with IA.

Semester 2:

1. Leadership and Management in an IA-Driven Environment: Exploration of the role of managers in leading and managing teams in an IA-driven environment.
2. Governance of IA: Understanding and application of the principles of governance in IA.
3. Resilience in IA: Development of resilience strategies to adapt to changes in IA.

4. Foresight in IA: Anticipation of future trends in IA and development of forward-looking strategies.
5. Capstone Project: Application of the knowledge and skills gained throughout the program in a real-world IA project.

Evaluation Procedures:

The evaluation for this long-term program will be based on:
1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Participants will be required to complete assignments demonstrating their understanding of the course content and ability to apply resilience and foresight strategies.
3. Exams (20%): Midterm and final exams will be conducted to assess the participants' understanding of the fundamental and advanced technologies and concepts of IA.
4. Capstone Project (30%): Participants must develop a strategic plan for implementing IA in a business scenario. The plan should demonstrate their understanding of IA and its strategic applications, their ability to manage the risks and challenges associated with IA, their understanding of the principles of governance in IA, and their ability to apply resilience and foresight strategies.

Curriculum 4: Microprogram on Intelligent Automation for Entrepreneurs

Course Description:

This microprogram is designed to equip entrepreneurs with a foundational understanding of Intelligent Automation (IA). The course will cover the basics of IA, its potential applications in various business operations, and the strategic considerations for implementing IA in a startup or small business setting. The course is structured to cater to adult learners, focusing on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this microprogram, participants will be able to:
1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in their business operations.
3. Develop a strategic plan for the implementation of IA in their business.
4. Understand the risks associated with IA and develop strategies to manage them.

Course Content:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance various business operations, focusing on applications relevant to startups and small businesses.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Identifying the risks associated with IA and developing strategies to manage these risks.

Evaluation Procedures:

The evaluation for this microprogram will be based on:
1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (40%): Participants must complete assignments demonstrating their understanding of the course content.
3. Final Project (40%): Participants must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their understanding of IA, its potential applications, and their ability to manage the risks associated with IA.

Curriculum 5: Short-term program on Intelligent Automation for Entrepreneurs

Course Description:

This 90-hour short-term program is designed to provide entrepreneurs with a comprehensive understanding of Intelligent Automation (IA). The course will delve into the basics of IA, its potential applications in various business operations, strategic considerations for implementing IA, and risk management. The program is structured to cater to adult learners, focusing on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this short-term program, participants will be able to:

1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in their business operations.
3. Develop a strategic plan for the implementation of IA in their business.
4. Understand the risks associated with IA and develop strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance various business operations, focusing on applications relevant to startups and small businesses.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Identifying the risks associated with IA and developing strategies to manage these risks.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Evaluation Procedures:

The evaluation for this short-term program will be based on:

1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Participants must complete assignments demonstrating their understanding of the course content.
3. Midterm Exam (20%): A midterm exam will be conducted to assess the participants' understanding of IA's fundamental technologies and concepts.
4. Final Project (30%): Participants must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their

understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 6: Long-term program on Intelligent Automation for Entrepreneurs

Course Description:

This long-term program, consisting of ten 40-hour courses, is designed to provide entrepreneurs with a comprehensive and in-depth understanding of Intelligent Automation (IA). The course will cover the fundamentals and advanced aspects of IA, its strategic applications in business management, and the role of entrepreneurs in implementing IA, managing its risks, and leading in an IA-driven environment. The program is structured to cater to adult learners, focusing on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this long-term program, participants will be able to:
1. Understand the fundamental and advanced technologies and concepts of IA.
2. Identify and evaluate the potential applications of IA in their business operations.
3. Develop and implement strategies for the effective use of IA.
4. Manage the risks and challenges associated with IA.
5. Lead and manage teams in an IA-driven environment.
6. Understand and apply the principles of governance in IA.

Course Content:

The program consists of ten courses:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Advanced IA Technologies and Concepts: In-depth exploration of advanced IA technologies and concepts.
3. Applications of IA in Business: Identifying and evaluating how IA can enhance various business operations.
4. Strategic Implementation of IA: Developing and implementing strategies for effectively using IA.
5. Risk Management in IA: Identifying and managing the risks and challenges associated with IA.
6. Leadership and Management in an IA-Driven Environment: Exploration of the role of entrepreneurs in leading and managing teams in an IA-driven environment.
7. Governance of IA: Understanding and application of the principles of governance in IA.
8. Entrepreneurship and IA: Exploration of the intersection of entrepreneurship and IA, including case studies of successful IA-driven startups.
9. Innovation and IA: Understanding how IA can drive innovation in business operations.

10. Capstone Project: Application of the knowledge and skills gained throughout the program in a real-world IA project.

Evaluation Procedures:

The evaluation for this long-term program will be based on:

1. Participation and Engagement (20%): Participants will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Participants must complete assignments demonstrating their understanding of the course content.
3. Exams (20%): Midterm and final exams will be conducted to assess the participants' understanding of the fundamental and advanced technologies and concepts of IA.
4. Capstone Project (30%): Participants must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 7: Microprogram on Intelligent Automation for Business students – undergraduate

Course Description:

This microprogram, lasting for 40 hours, is designed to introduce undergraduate business students to Intelligent Automation (IA). The course will cover the basics of IA, its potential applications in business, and the strategic considerations for implementing IA in a business setting. The course is structured to cater to the needs of undergraduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this microprogram, students will be able to:

1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in various business operations.
3. Understand the strategic considerations for implementing IA in a business setting.
4. Understand the risks associated with IA and basic strategies to manage them.

Course Content:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance various business operations, focusing on applications relevant to business students.
3. Strategic Implementation of IA: Understanding of the strategic considerations for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Basic understanding of the risks associated with IA and strategies to manage these risks.

Evaluation Procedures:

The evaluation for this microprogram will be based on:

1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (40%): Students must complete assignments demonstrating their understanding of the course content.
3. Final Exam (40%): A final exam will assess the students' understanding of IA's fundamental technologies and concepts, its potential applications, and the strategic considerations for implementing IA in a business setting.

Curriculum 8: Short-term program on Intelligent Automation for Business students – undergraduate

Course Description:
This 90-hour short-term program is designed to provide undergraduate business students with a comprehensive understanding of Intelligent Automation (IA). The course will delve into the basics of IA, its potential applications in various business operations, strategic considerations for implementing IA, and risk management. The program is structured to cater to undergraduate students, focusing on practical, real-world applications of IA.

Learning Outcomes:
Upon completion of this short-term program, students will be able to:
1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in various business operations.
3. Develop a strategic plan for the implementation of IA in their business.
4. Understand the risks associated with IA and develop strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance various business operations, focusing on applications relevant to business students.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Identifying the risks associated with IA and developing strategies to manage these risks.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Evaluation Procedures:
The evaluation for this short-term program will be based on:
1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exam (20%): A midterm exam will be conducted to assess the students' understanding of the fundamental technologies and concepts of IA.

4. Final Project (30%): Students must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 9: Long-term program on Intelligent Automation for Business students – undergraduate

Course Description:

This long-term program, spanning two semesters with five 56-hour courses each semester, is designed to provide undergraduate business students with a comprehensive and in-depth understanding of Intelligent Automation (IA). The program will cover the basics to advanced aspects of IA, its potential applications in business, strategic considerations for implementing IA, risk management, and governance. The program is structured to cater to the needs of undergraduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this long-term program, students will be able to:
1. Understand the fundamentals of advanced technologies and concepts of IA.
2. Identify and evaluate potential applications of IA in business operations.
3. Develop and implement strategies for the effective use of IA.
4. Understand the risks associated with IA and develop strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:

Semester 1:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Business: Exploration of how IA can enhance various business operations.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA.
4. Risk Management in IA: Identification of the risks associated with IA and strategies to manage these risks.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Semester 2:
1. Advanced Intelligent Automation: In-depth exploration of advanced IA technologies and concepts.
2. Strategic Development/Management for IA: Advanced strategies for effectively using IA in business.
3. Use Cases for IA Implementation: Real-world examples and case studies of IA implementation in business.

4. Risk Management in Advanced IA: Advanced strategies for managing the risks associated with IA.
5. Governance of Advanced IA: Advanced principles of governance in IA.

Evaluation Procedures:

The evaluation for this long-term program will be based on:

1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exams (20%): Midterm exams will be conducted each semester to assess the students' understanding of the course content.
4. Final Projects (30%): Students must develop a strategic plan for implementing IA in a hypothetical business scenario at the end of each semester. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 10: Microprogram on Intelligent Automation for Business students – graduate

Course Description:

This microprogram, lasting 40 hours, is designed to provide graduate business students with a comprehensive understanding of Intelligent Automation (IA). The course will delve into the basics and advanced aspects of IA, its potential applications in business management, and the strategic considerations for implementing IA. The course is structured to cater to the needs of graduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this microprogram, students will be able to:

1. Understand the fundamental and advanced technologies and concepts of IA.
2. Identify and evaluate the potential applications of IA in their business operations.
3. Develop and implement strategies for the effective use of IA.
4. Understand the risks associated with IA and develop strategies to manage them.

Course Content:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Advanced IA Technologies and Concepts: In-depth exploration of advanced IA technologies and concepts.
3. Applications of IA in Business: Identifying and evaluating how IA can enhance various business operations.
4. Strategic Implementation of IA: Developing and implementing strategies for effectively using IA.
5. Risk Management in IA: Identification and management of the risks associated with IA.

Evaluation Procedures:

The evaluation for this microprogram will be based on:

1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exam (20%): A midterm exam will be conducted to assess the students' understanding of the fundamental and advanced technologies and concepts of IA.
4. Final Project (30%): Students must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their understanding

of IA, its potential applications, and their ability to manage the risks associated with IA.

Curriculum 11: Short-term program on Intelligent Automation for Business students – graduate

Course Description:

This 90-hour short-term program is designed to provide graduate business students with an in-depth understanding of Intelligent Automation (IA). The course will delve into the advanced aspects of IA, its potential applications in business management, strategic considerations for implementing IA, risk management, and governance. The program is structured to cater to the needs of graduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this short-term program, students will be able to:

1. Understand the advanced technologies and concepts of IA.
2. Identify and evaluate the potential applications of IA in their business operations.
3. Develop and implement strategies for the effective use of IA.
4. Understand the risks associated with IA and develop strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:

1. Advanced Intelligent Automation: In-depth exploration of advanced IA technologies and concepts.
2. Applications of IA in Business: Identifying and evaluating how IA can enhance various business operations.
3. Strategic Implementation of IA: Developing and implementing strategies for effectively using IA.
4. Risk Management in IA: Identification and management of the risks associated with IA.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Evaluation Procedures:

The evaluation for this short-term program will be based on:

1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exam (20%): A midterm exam will be conducted to assess the students' understanding of the advanced technologies and concepts of IA.

4. Final Project (30%): Students must develop a strategic plan for implementing IA in a hypothetical business scenario. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 12: Long-term program on Intelligent Automation for Business students – graduate

Course Description:

This long-term program, spanning two semesters with five 56-hour courses each semester, is designed to provide graduate business students with a comprehensive and in-depth understanding of Intelligent Automation (IA). The program will cover advanced aspects of IA, its potential applications in business management, strategic considerations for implementing IA, risk management, and governance. The program is structured to cater to the needs of graduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this long-term program, students will be able to:
1. Understand the advanced technologies and concepts of IA.
2. Identify and evaluate potential applications of IA in business management.
3. Develop and implement advanced strategies for the effective use of IA.
4. Understand the risks associated with IA and develop advanced strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:

Semester 1:
1. Advanced Intelligent Automation: In-depth exploration of advanced IA technologies and concepts.
2. Applications of IA in Business Management: Exploration of how IA can enhance various business management operations.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA.
4. Risk Management in IA: Identification of the risks associated with IA and strategies to manage these risks.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Semester 2:
1. Advanced IA Technologies and Concepts: Further exploration of advanced IA technologies and concepts.
2. Strategic Development/Management for IA: Advanced strategies for effectively using IA in business management.
3. Use Cases for IA Implementation in Business Management: Real-world examples and case studies of IA implementation in business management.

4. Risk Management in Advanced IA: Advanced strategies for managing the risks associated with IA.
   5. Governance of Advanced IA: Advanced principles of governance in IA.

Evaluation Procedures:

The evaluation for this long-term program will be based on:
   1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
   2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
   3. Midterm Exams (20%): Midterm exams will be conducted each semester to assess the students' understanding of the course content.
   4. Final Projects (30%): Students must develop a strategic plan for implementing IA in a hypothetical business management scenario at the end of each semester. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

Curriculum 13: Microprogram on Intelligent Automation for Non-tech students – undergraduate

Course Description:
This microprogram is designed to introduce non-tech undergraduate students to the field of Intelligent Automation (IA). The course will cover the basics of IA and its potential applications in various non-tech fields. The course is structured to cater to the needs of undergraduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:
Upon completion of this microprogram, students will be able to:
1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in their respective fields.
3. Understand the basic strategic considerations for implementing IA in a non-tech setting.
4. Understand the risks associated with IA and basic strategies to manage them.

Course Content:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Non-Tech Fields: Exploration of how IA can enhance various non-tech operations, focusing on applications relevant to non-tech students.
3. Strategic Implementation of IA: Understanding of the basic strategic considerations for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Basic understanding of the risks associated with IA and strategies to manage these risks.

Evaluation Procedures:
The evaluation for this microprogram will be based on:
1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (40%): Students must complete assignments demonstrating their understanding of the course content.
3. Final Exam (40%): A final exam will assess the students' understanding of the fundamental technologies and concepts of IA, its potential applications, and the strategic considerations for implementing IA in a non-tech setting.

Curriculum 14: Short-term program on Intelligent Automation for Non-tech students – undergraduate

Course Description:

This 90-hour short-term program is designed to provide non-tech undergraduate students with a comprehensive understanding of Intelligent Automation (IA). The course will delve into the basics of IA, its potential applications in various non-tech fields, strategic considerations for implementing IA, and risk management. The program is structured to cater to the needs of undergraduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this short-term program, students will be able to:

1. Understand the fundamental technologies and concepts of IA.
2. Identify potential applications of IA in their respective fields.
3. Develop a basic strategic plan for the implementation of IA in their field.
4. Understand the risks associated with IA and develop strategies to manage them.

Course Content:

1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Non-Tech Fields: Exploration of how IA can enhance various non-tech operations, focusing on applications relevant to non-tech students.
3. Strategic Implementation of IA: Development of a basic strategic plan for implementing IA, including considerations for budget, resources, and timeline.
4. Risk Management in IA: Identifying the risks associated with IA and developing strategies to manage these risks.

Evaluation Procedures:

The evaluation for this short-term program will be based on:

1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exam (20%): A midterm exam will be conducted to assess the students' understanding of the fundamental technologies and concepts of IA.
4. Final Project (30%): Students must develop a strategic plan for implementing IA in a hypothetical non-tech scenario. The plan should demonstrate their understanding of IA, its potential applications, and their ability to manage the risks associated with IA.

Curriculum 15: Long-term program on Intelligent Automation for Non-tech students – undergraduate

Course Description:

This long-term program, spanning two semesters with five 56-hour courses each semester, is designed to provide non-tech undergraduate students with a comprehensive and in-depth understanding of Intelligent Automation (IA). The program will cover the basics to advanced aspects of IA, its potential applications in various non-tech fields, strategic considerations for implementing IA, risk management, and governance. The program is structured to cater to the needs of undergraduate students, with a focus on practical, real-world applications of IA.

Learning Outcomes:

Upon completion of this long-term program, students will be able to:
1. Understand the fundamentals of advanced technologies and concepts of IA.
2. Identify and evaluate potential applications of IA in their respective fields.
3. Develop and implement strategies for the effective use of IA.
4. Understand the risks associated with IA and develop strategies to manage them.
5. Understand and apply the principles of governance in IA.

Course Content:

Semester 1:
1. Introduction to Intelligent Automation: Overview of IA, its technologies, and concepts.
2. Applications of IA in Non-Tech Fields: Exploration of how IA can enhance non-tech operations.
3. Strategic Implementation of IA: Development of a strategic plan for implementing IA.
4. Risk Management in IA: Identification of the risks associated with IA and strategies to manage these risks.
5. Governance of IA: Understanding and application of the principles of governance in IA.

Semester 2:
1. Advanced Intelligent Automation: In-depth exploration of advanced IA technologies and concepts.
2. Strategic Development/Management for IA: Advanced strategies for effectively using IA in non-tech fields.
3. Use Cases for IA Implementation: Real-world examples and case studies of IA implementation in non-tech fields.

4. Risk Management in Advanced IA: Advanced strategies for managing the risks associated with IA.
5. Governance of Advanced IA: Advanced principles of governance in IA.

Evaluation Procedures:

The evaluation for this long-term program will be based on:
1. Participation and Engagement (20%): Students will be evaluated on their active participation and engagement in the course activities and discussions.
2. Assignments (30%): Students must complete assignments demonstrating their understanding of the course content.
3. Midterm Exams (20%): Midterm exams will be conducted each semester to assess the students' understanding of the course content.
4. Final Projects (30%): Students must develop a strategic plan for implementing IA in a hypothetical non-tech scenario at the end of each semester. The plan should demonstrate their understanding of IA, its potential applications, their ability to manage the risks associated with IA, and their understanding of the principles of governance in IA.

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