

TEACHER'S GUIDEBOOK: Girls Go STEM



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ABOUT THE GIRLS GO STEM PROGRAMME

Welcome to Girls Go STEM!

This guidebook offers a comprehensive overview of the Girls Go STEM (GGS) programme, including details on our courses and the Circular Learning Space – our interactive platform that guides and supports students on their journey towards a digital and sustainable education.

STEM Knowledge, Skills and Competencies for All

Each course in our learning programme explores an area from Science, Technology, Engineering, and Mathematics (STEM) and Circular Economy domains, equipping students with the skills and knowledge needed to address the critical challenges of our time.

Of course, the Girls Go STEM courses go beyond just knowledge. Our courses adopt a learning-by-doing and challenge-based approach, actively engaging students with essential 21st-century skills and competencies. These are drawn from three key EU frameworks: [GreenComp](#), [DigComp](#), and [EntreComp](#), ensuring that students gain not only theoretical insights but also practical skills for a digital and sustainable future. Girls Go STEM courses address the growing demand in the European workforce for new talent and skill sets capable of leveraging cutting-edge technologies to lead the green and digital transformation. Girls Go STEM is a flagship initiative supporting the objectives of the [Union of Skills](#) and [STEM Education Strategic Plan](#).

Recognising the underrepresentation of women in STEM and Information Technology (IT) studies and careers, Girls Go STEM is purposefully designed to promote gender equality and empower girls aged 14 to 19 across Europe to become future leaders and entrepreneurs in these key fields. However, the programme is **open to all learners**. We believe it is crucial for the next generation of men to understand the vital role of women in science and technology and to become advocates and allies, both in education and the workplace, to help build a more equitable future.



Structure of the Girls Go STEM Programme

The Girls Go STEM programme has three types of courses:

- **Introductory Courses:** These courses serve as the onboarding stage for all students, offering essential knowledge to start the programme. At the moment we have two introductory courses (*A Quick Introduction: How to Stay Safe Online and Introduction to the Circular Economy 2025*).

The first course offers essential guidelines for safe and responsible online behaviour, and the second provides an overview of key concepts on the circular economy. Each course takes one hour to complete, and completion of both introductory courses are required before advancing to Foundation or Advanced Courses.

- **Foundation Courses:** These courses introduce students to specific thematic areas. Each course is designed to take **approximately three hours**. These courses may require greater guidance from teachers, particularly as students explore new topics or practice new skills. Aligned with [Bloom's Taxonomy](#), foundation courses are structured to help students engage in remembering, understanding, applying, and (non-complex forms of) analysing. The focus is on building foundational knowledge and competencies while encouraging active participation and hands-on learning.

The structure of every Foundation Course is the same:

1 hour of content learning, where students are introduced to core concepts and relevant information.

2 hours of 'explorative' challenge-based learning, where students actively engage with real-world problems and apply what they have learned in practical tasks.

- **Advanced Courses:** These courses are designed to help students extend and apply their growing knowledge through small-scale simulations and projects that tackle real-world problems in an active and creative manner. Each Advanced course typically takes **about five hours** to complete.

Aligned with [Bloom's Taxonomy](#), advanced courses encourage students to engage in more complex forms of analysing, synthesising, evaluating, and creating. Advanced courses provide age-appropriate opportunities for students to engage in critical and independent thinking, allowing them to explore innovative solutions to pressing challenges in the circular economy and STEM.

The structure of every Advanced Course is the same:

2 hours of content learning, where students deepen their understanding of advanced concepts and theories.

3 hours of "creative" challenge-based learning, where students engage in practical applications of their knowledge through hands-on projects and simulations.

The content and challenge learning in every course are structured in series of 30-minute learning units. This design allows for flexible integration into your classroom, accommodating various teaching styles and schedules. You can choose to deliver an entire course as a focused event over one or two days, or you might prefer to integrate each learning unit into regular timetabled sessions over several weeks. We hope this flexibility support you in using our resources effectively.

Courses' Assessment and Completion

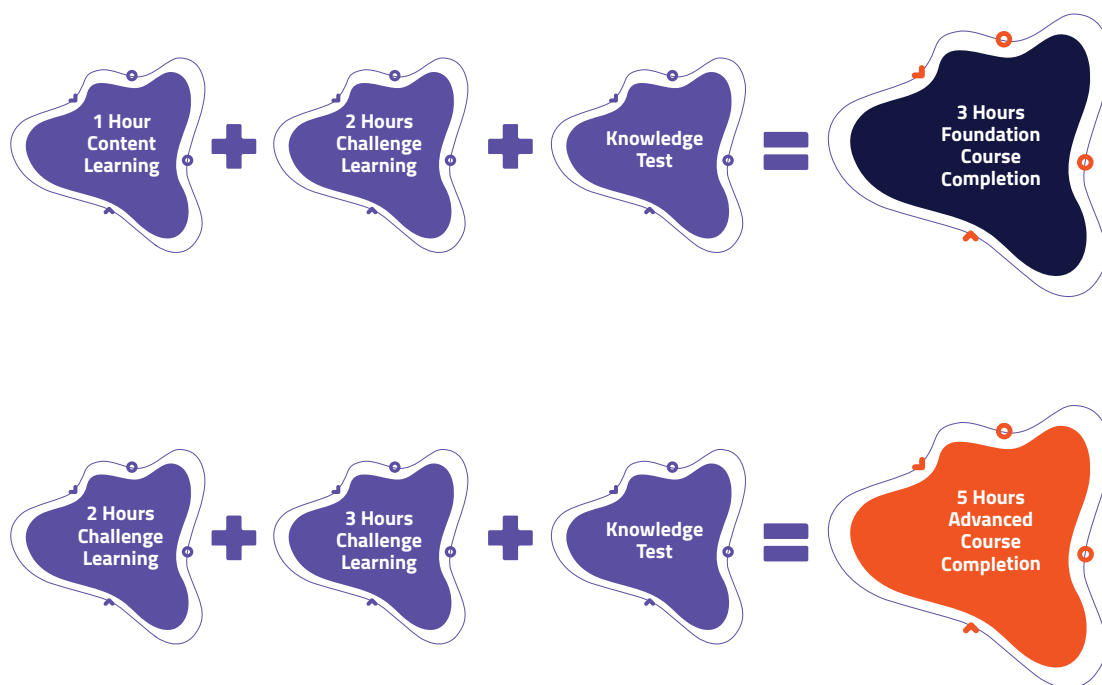
The completion of the course on the platform is achieved when a student has gone through all the content, completed all course online activities (like interactive games and short quizzes), and passed the final quiz.

Each Foundation and Advanced Course has two types of assessment:

Final Knowledge Test: An online test in the end of the course checks students' understanding and knowledge of the course content. To pass the test, student needs to score more than 75%. The number of attempts is unlimited.

Teacher-Assessed Skills Challenge: Teachers assess the challenge-based learning part, i.e. how well students have developed the required skills through practical tasks and challenges. This assessment is NOT done via the platform.

This dual assessment strategy provides a comprehensive overview of each student's learning journey, ensuring they develop both the skills and knowledge necessary for success in STEM and the circular economy domains.



Learning Pathways

Our courses are organized into structured Learning Pathways. A Learning Pathway connects 3–5 courses around a central theme or concept. This allows students to dive deeper into a topic, explore it from multiple angles, connect ideas across different areas, and develop a clear, interdisciplinary understanding of how it applies to the real world.

Currently there are ten Learning Pathways (LPs): one introduction and nine thematic.

Introduction Pathway (LP0) consists of two introductory courses: *Introduction to the Circular Economy 2025* and *A Quick Introduction: How to Stay Safe Online*.

Any thematic Learning Pathway (LP1–LP9) consists of 3–5 courses.

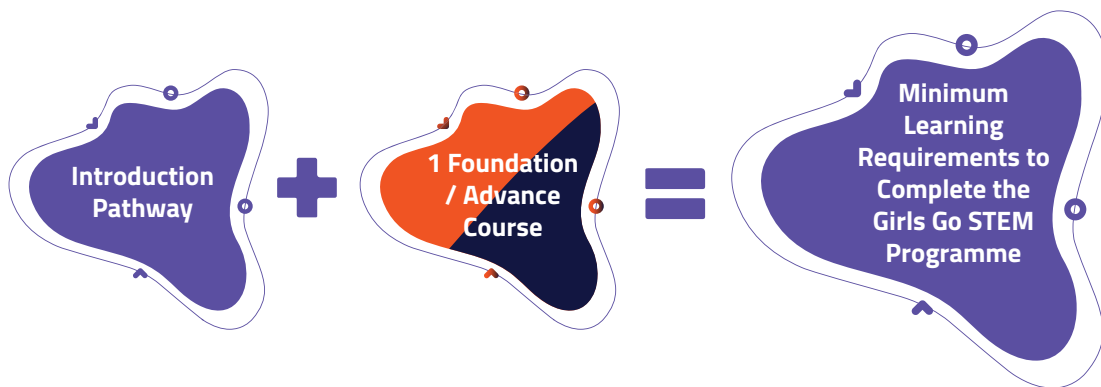
Thematic Learning Pathway	Courses included in the LP
1. The Hidden Life of Things Around Me (11 hours) Explore the hidden impact of everyday things: clothes, smartphones, and food. Learn to think critically, act locally, and create real-world solutions for a more sustainable tomorrow.	Smart School Garden Unlocking Fashion Circularity Circularity of Smartphones and Handheld Devices
2. Changing Consumer Lifestyles and Habits (11 hours) Explore how everyday choices affect people and the planet, and how changing those choices can create real impact. Tackle consumption challenges through Design Thinking, tracking E-waste with AI and reimagining urban food systems.	Circular Economy of Food in the Cities Beyond Recycling: Creating Sustainable Communities E-waste and the Circular Economy
3. Shaping the Cities of Tomorrow (13 hours) Explore how innovation, sustainability, and smart design can transform urban life. Rethink how we move through cities, redesign infrastructure and public spaces to support healthier, more inclusive, and more sustainable cities.	Future Mobility: Technology, Ethics, and Sustainability A Circular Approach to Urban Mobility Urban Futures: Building Together the Cities of Tomorrow
4. Circular Life of Materials (15 hours) Explore how materials shape our world and how we can shape a more sustainable future. From semiconductors and plastics to metals and bio-based innovations - discover how smart design, reuse and responsible production can reduce waste and support a healthier planet.	Rethinking Plastics Metals and the Circular Economy From Sand to Systems: The Chips of Modern Electronics Biomanufacturing for a Healthy Planet The Power of Advanced Materials
5. Discover Digital (11 hours) Explore the digital world through the lens of sustainability, innovation, and safety. Discover how technology shapes our lives - and how we can shape a more responsible digital future.	Artificial Intelligence and the Circular Economy Navigating Digital Life: From Safety to Sustainability Circular Thinking in the World of Video Games
6. Systems and Industries of Tomorrow (13 hours) Explore the systems and industries shaping our future: from fashion and semiconductors to robotics and smart manufacturing. Discover how global challenges like climate change and waste are driving change across supply chains, factories, and design labs.	The Future of Robotics and the Circular Economy The Chip Lab: Advanced Semiconductors & Systems Designing Fashion Circularity
7. Food for the Future (14 hours) Explore how we can create a healthier planet and food system through innovation, technology, and design. Learn about soil health and regenerative farming, design eco-friendly packaging, and develop tech-based solutions to food security problems.	Feeding the Future: Tech Solutions for Food Security and Safety Healthy Soil, Healthy Human, Healthy Planet Life Cycle of a Pack: How Everyday Choices Shape the Planet Planet-Friendly Packaging Lab
8. Building Healthy Futures (13 hours) Explore how technology, design, and sustainability intersect to create healthier, more equitable, and climate-resilient environments. Design energy-efficient hospital workflows, safer street layouts, climate-resilient green spaces and evaluate the impacts of your solutions.	Circular Hospitals: Transforming Healthcare Smart and Healthy Cities: Foundations Justice, Climate & Health in Urban Spaces
9. Sky, Space and Beyond (9 hours) Explore space, aerial and space data and related technologies, policies and real-life challenges. Dive into space to address environmental challenges and support more sustainable decision-making.	Space Debris: From Orbital Chaos to Sustainable Space Eyes on Earth: Space Data for Earth Observation Drones in Action: Solving Real-World Challenges Across Food, Health and Mobility

Completion and Certification

We celebrate students' achievements all along the learning journey.

Course completion: Upon successful completion of a course, students will receive four CV Statements that highlight their competencies in key areas: green skills, digital skills, entrepreneurial skills, and deep technology knowledge. These statements are a clear and concise way for students to showcase their expertise for future opportunities, whether in further education or job applications. For each completed course students also get a digital badge that highlights the topic and the related skills achieved.

Milestone Achievement: As a minimum requirement for the Girls Go STEM programme completion, a student must complete the Introduction Pathway (LP0) and at least one Foundation or Advanced course from any thematic Learning Pathway. Students will receive a Milestone Certificate to recognise this achievement.



Learning Pathway Achievement: You and your students are encouraged to explore beyond the minimum requirements. Completing any thematic Learning Pathway (on top of LP0) will award a student with a Learning Pathway Certificate.

Both Milestone and Learning Pathway certificates recognise students' achievements and serve as valuable credentials for students as they pursue further education or career opportunities.

CIRCULAR LEARNING SPACE: OUR ONLINE PLATFORM

The Circular Learning Space (CLS), an online platform, is at core of the Girls Go STEM initiative.

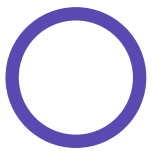
Registering on the Platform

The Circular Learning Space is for everyone – anyone can create an account and start learning or using it in teaching.

Registering as a teacher and using school codes

With a teacher account you will be able to:

- Access all teacher courses
- Access all student courses
- Track your students' learning progress
- Access all the teacher guidelines and support materials



How to get a school code and register as a teacher?

1. If you are from one of our partner networks the partner in your country will collect your teacher data and send it to the Girls Go STEM team on behalf of your school. You do not need to contact the Girls Go STEM team separately.
2. If you are not from our partner's network, please write an e-mail to girlsgostem@eitrawmaterials.eu requesting access to the platform, and we will generate a unique school code for your school. In your request, please give us the following information:

School Address

City

Country

Subject you teach

Private or Public School

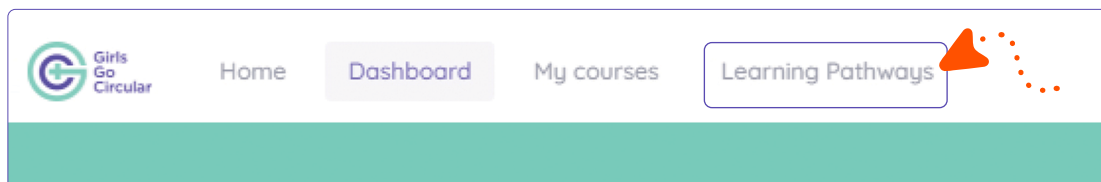
After you get a school code from us, please create your account using your code and inform us that the account has been created. We will manually give you teacher's rights on the platform. Through your teacher profile, you will be able to monitor your students' progress and have access to GGS Teacher Courses and other resources.

Registering Students

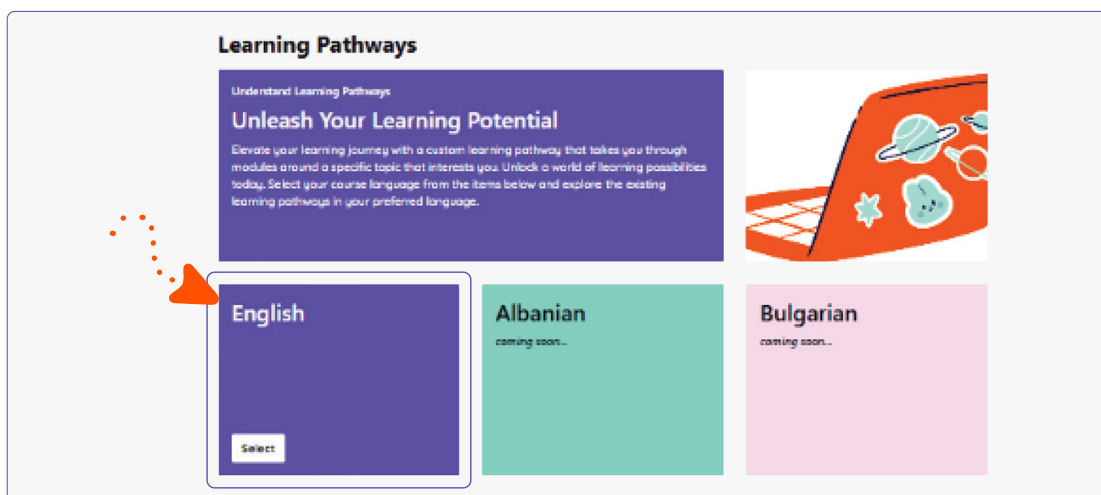
To be able to track your students' progress, share your school code with your students, and make sure they use it when registering. Each student needs to create their own account to be able to access the content. This will automatically assign them to your virtual school.

Where to Find Learning Pathways and Courses?

To get access to any course, you need to enroll in the Learning Pathway that includes that course. Click on the Learning Pathways Tab in the top menu:



Choose your language in the opened list:



Choose the pathway you want to explore:

Learning Pathways - English

Introduction (LP00EN) Explore	The Hidden Life of Things Around Me (LP01EN) Explore	Changing Consumer Lifestyles and Habits (LP02EN) Explore
Shaping the Cities of Tomorrow (LP03EN) Explore	Circular life of materials (LP04EN) Explore	Discover Digital (LP05EN) Explore
Systems and Industries of Tomorrow (LP06EN) Explore	Food for the Future (LP07EN) ...coming soon	Building Healthy Futures (LP08EN) Explore

Read the pathway description, and what courses it includes, and if you are interested – enroll yourself to this pathway:

Beyond Recycling: Creating Sustainable Consumption

Go beyond recycling and explore how everyday choices impact people and the planet. Using Design Thinking, you'll tackle a complex consumption challenge and create a prototype for positive change.

E-Waste and the Circular Economy

Explore the impact of e-waste and innovative recycling solutions. Using AI tools, you'll track the materials of an electronic device through its life cycle and discuss ways to improve e-waste management and support a circular economy.

Circular Economy of Food in the Cities:

Learn how urban food systems can tackle waste using big data, machine learning, and local action. You'll design real-world solutions to reduce food waste in your school and community.

If you want to start your learning journey in this Learning Pathway, please click the "Enrol me" button below! ✨

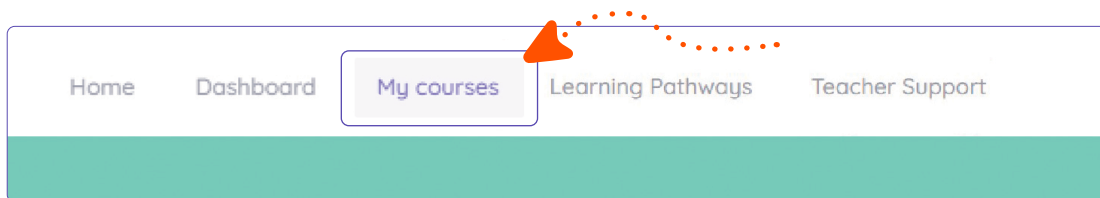
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▼ **Self enrolment (Learner)**

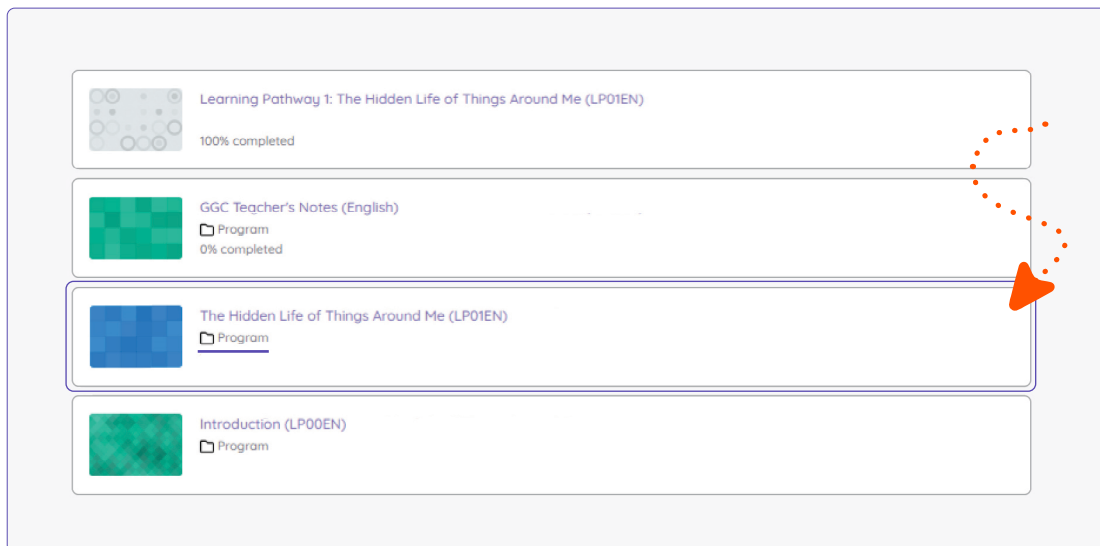
No enrolment key required.

[Enrol me](#)

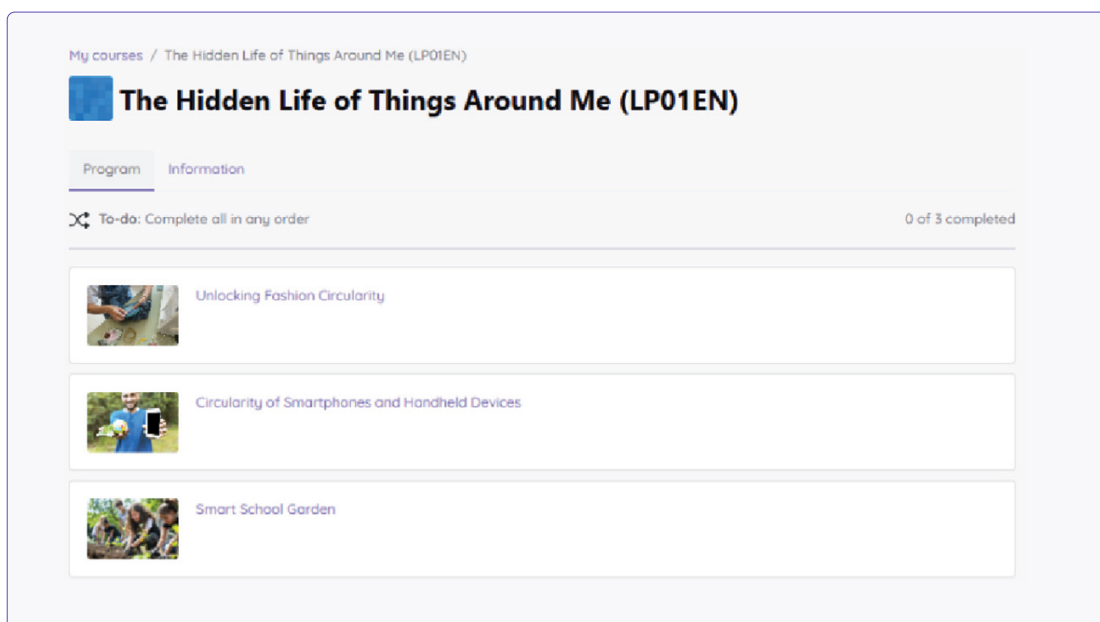
After the enrollment will you be able to see the pathway in “My courses” tab:



In “My courses” list, make sure to choose the pathway mentioning ‘program’ underneath:



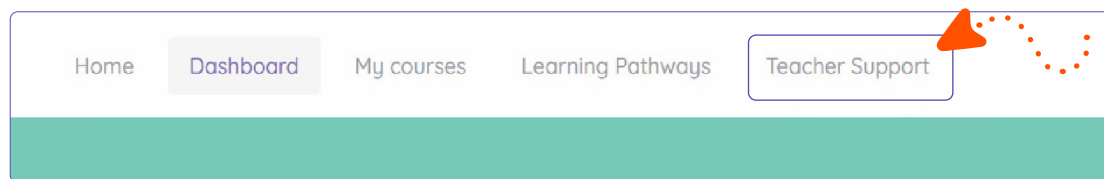
You will see all the courses of this pathway:



Teacher Support

Once you join the platform, you can explore the Teacher Support tab.

In the Teacher Support you will find several resources to help you implement the Girls Go STEM programme.



Teacher Guidebook

The guidebook you are reading at the moment. It clarifies the methodology and provides an overview of the Girls Go STEM programme and its courses.

Teacher's Notes

Teacher's Notes contain information on the Girls Go STEM methodology and more detailed guidelines on how to use each course.

Teacher's Notes I: Programme Methodology

Teacher's Notes II: How to use Introductory Courses with your students

Teacher's Notes III: How to use Foundation Courses with your students

Teacher's Notes IV: How to use Advanced Courses with your students

You have access to Teacher's Notes in English, and you can also access Teacher's Notes in other languages on this page:

You have four Teacher's Notes, containing information on the methodology used to develop the Girls Go Circular courses and suggestions on how to conduct them with your students. You automatically have access to these through your "My Courses" page, or follow the links provided here:

- [Teacher's Notes I: Programme Methodology](#)
- [Teacher's Notes II: How to use Introductory Courses with your students](#)
- [Teacher's Notes III: How to use Foundation Courses with your students](#)
- [Teacher's Notes IV: How to use Advanced Courses with your students](#)

You can find them also in YOUR language here: [GGS Teacher's Notes \(All Languages\)](#)

Reports

Using the report function you can check your students' progress.



Teacher Course Progress Report - allows you to track the progress of your students within the courses they are taking.



Teacher Learning Pathway Progress Report - allows you to track your students' Learning Pathway progress and completion status.



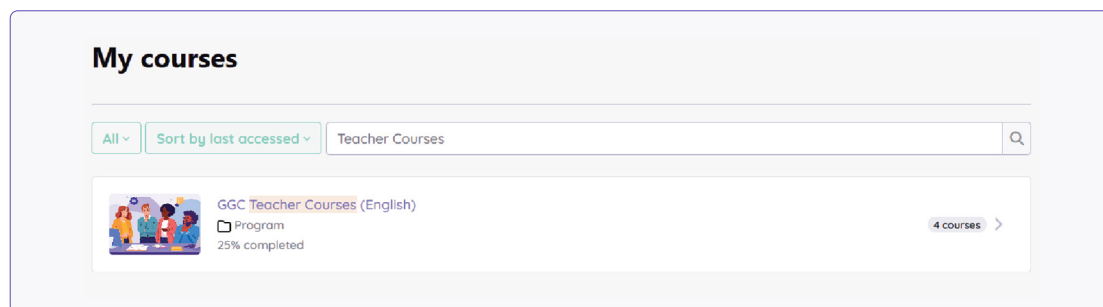
Teacher Report Students List - allows you to get an overview of students registered in your school.

Teacher Courses

Teachers play a vital role in every learning journey. To support and inspire teachers in their work, we offer GGS teacher courses. The course collection includes courses on crucial topics, such as AI pedagogy, teaching in disinformation era, entrepreneurial thinking and others.

Each course offers deep insights into its topic and comes with practical resources, including ready-to-use toolkits, lesson plans, and student materials.

If you are registered on the platform as a teacher, you are automatically enrolled in teacher courses in English. You can see them in My Courses (you can use the search function to find them):



You will be able to enroll yourself in the Teacher Programme in another language through the Teacher Support page.

Currently there are the following courses available

- Entrepreneurial Thinking in Education: Spark Ideas, Shape Futures
- Meaningful AI Pedagogy: Think Critically, Teach Creatively
- Digital Literacy for the Classroom: Tackling Disinformation
- Intellectual Property for Educators: From Copyright to Creativity
- How to Teach about Inclusion and How to Teach Inclusively
- How to Create a Motivating Classroom

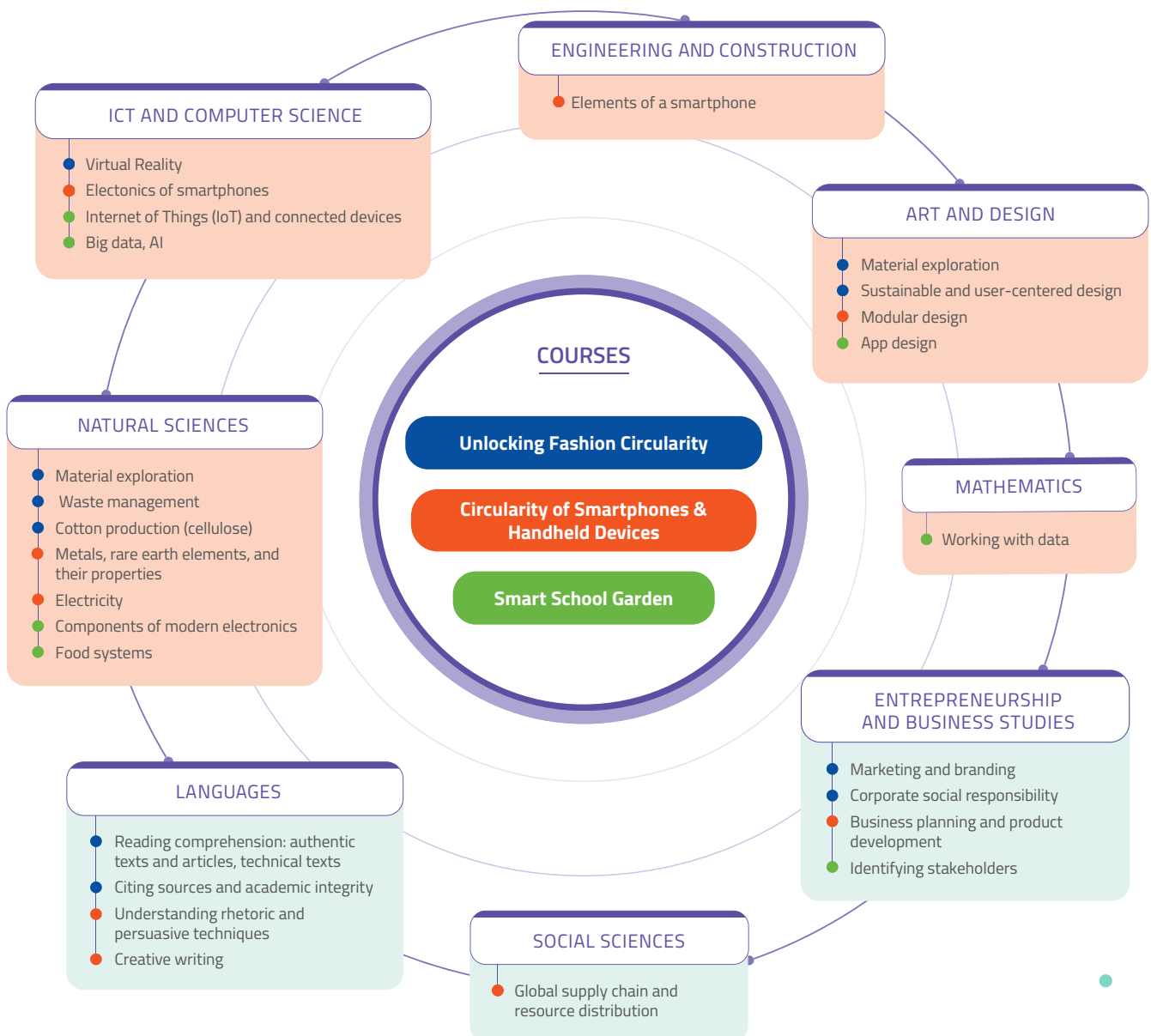
HOW ARE GIRLS GO STEM COURSES CONNECTED TO STEM FIELDS AND SCHOOL SUBJECTS?

Girls Go STEM regard STEM as an integrated multidimensional framework that connects education, practical skill, and entrepreneurial know-how.

This framework is technically anchored in the International Standard Classification of Education core fields of Natural sciences, mathematics, and statistics (05), Information and Communication Technologies (06), and Engineering, manufacturing, and construction (07) but moves beyond teaching subjects in isolation to create an interdisciplinary environment where knowledge is applied to solve complex problems and support the development of sustainable businesses.

The illustrations below suggest some school subjects and topics that can be taught using Girls Go STEM courses. These examples are given for illustrative purposes and do not represent all possible subjects and topics that can be taught using Girls Go STEM courses.

Learning Pathway 1 The Hidden Life of Things Around Me:



Learning Pathway 2

Changing Consumer Lifestyles and Habits



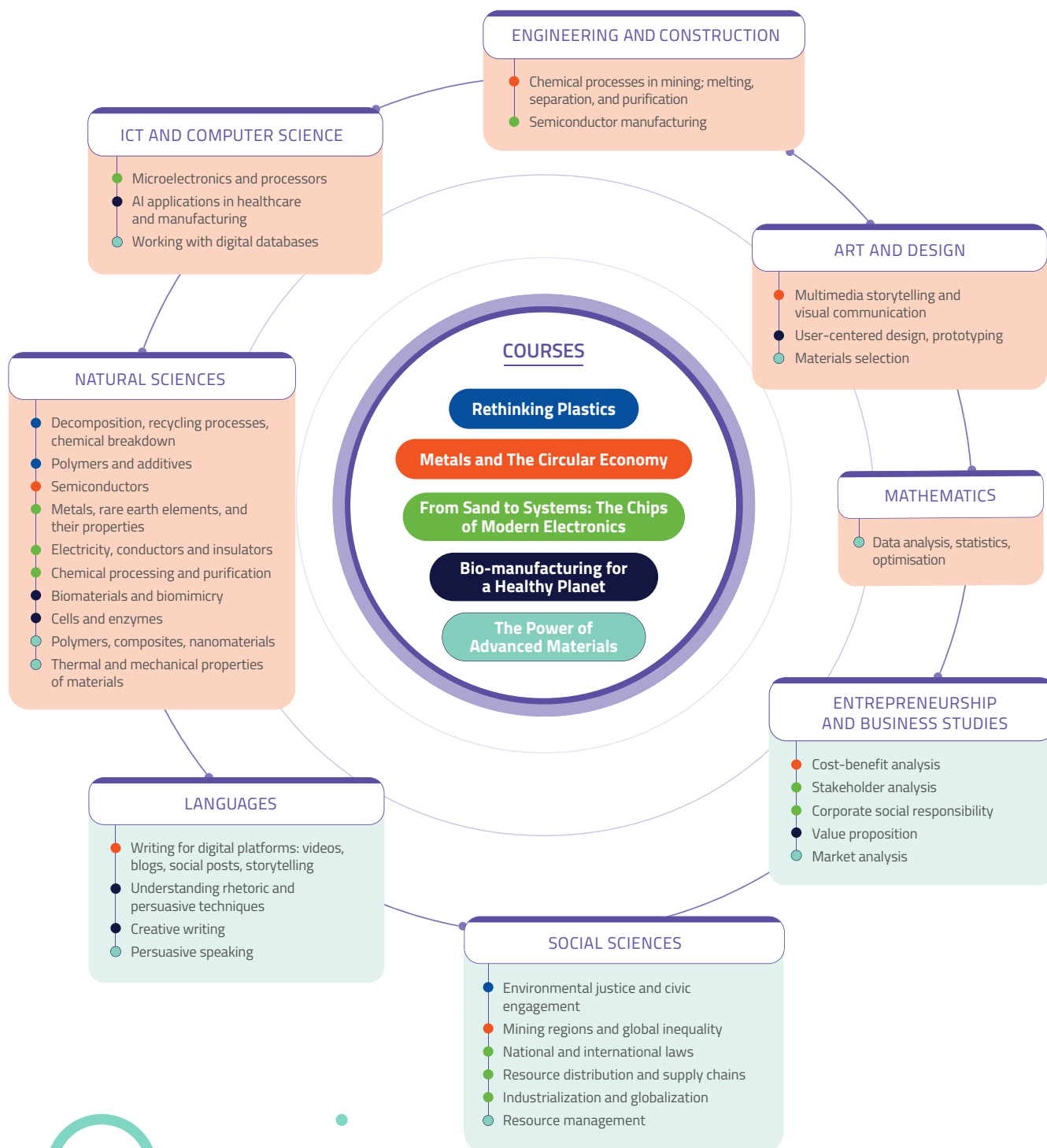
Learning Pathway 3

Shaping the Cities of Tomorrow



Learning Pathway 4

Circular Life of Materials



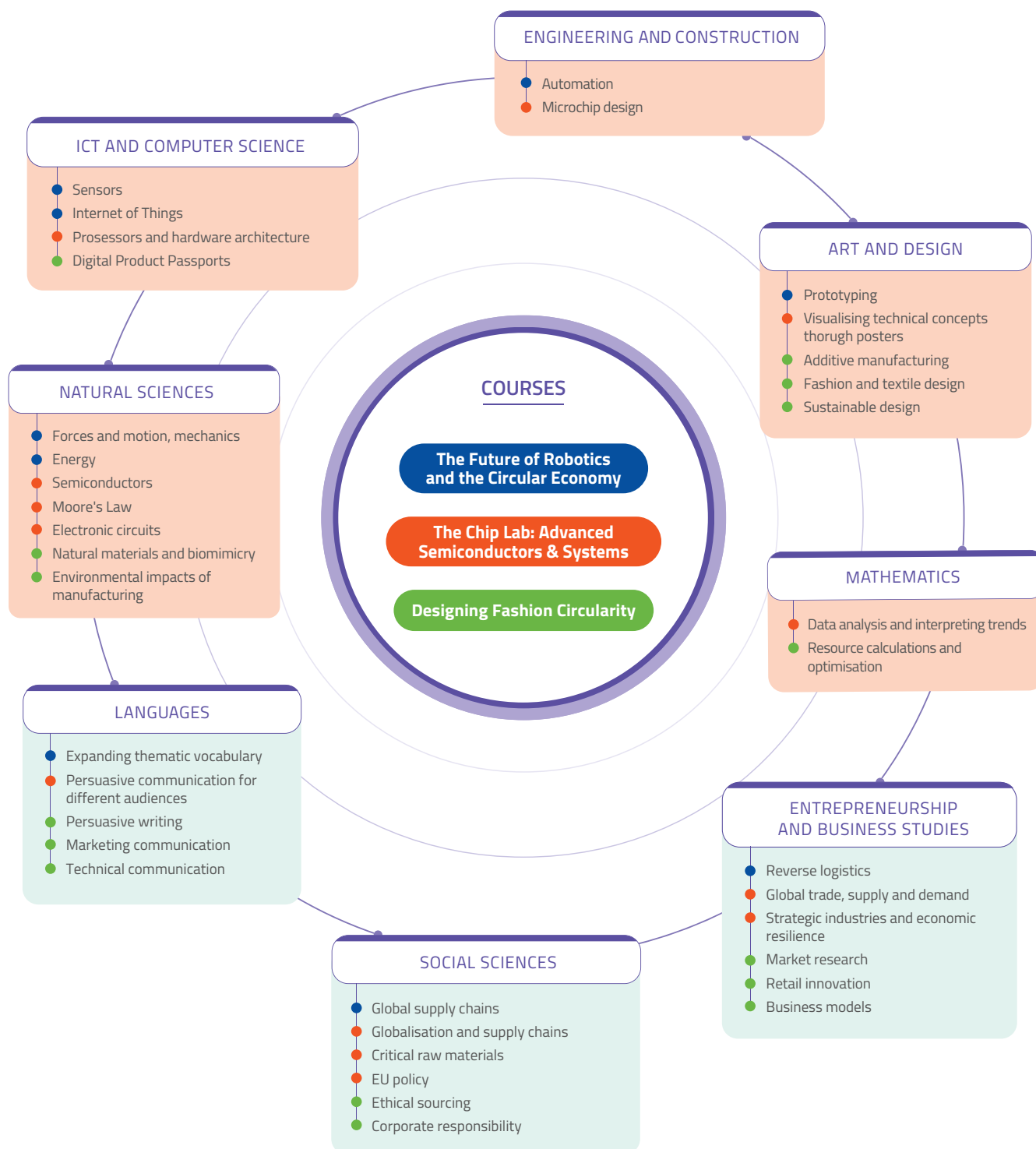
Learning Pathway 5

Discover Digital



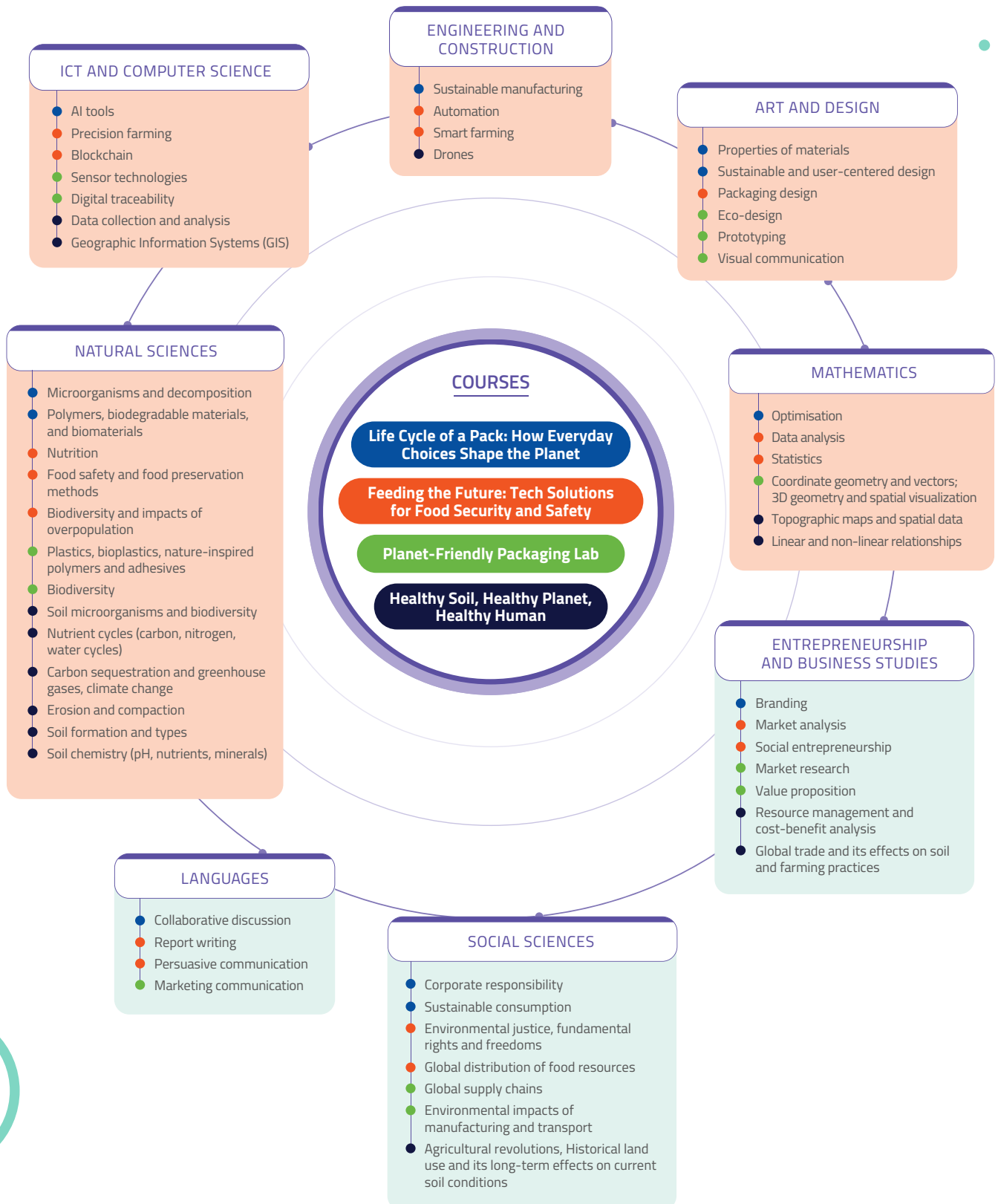
Learning Pathway 6

Systems and Industries of Tomorrow



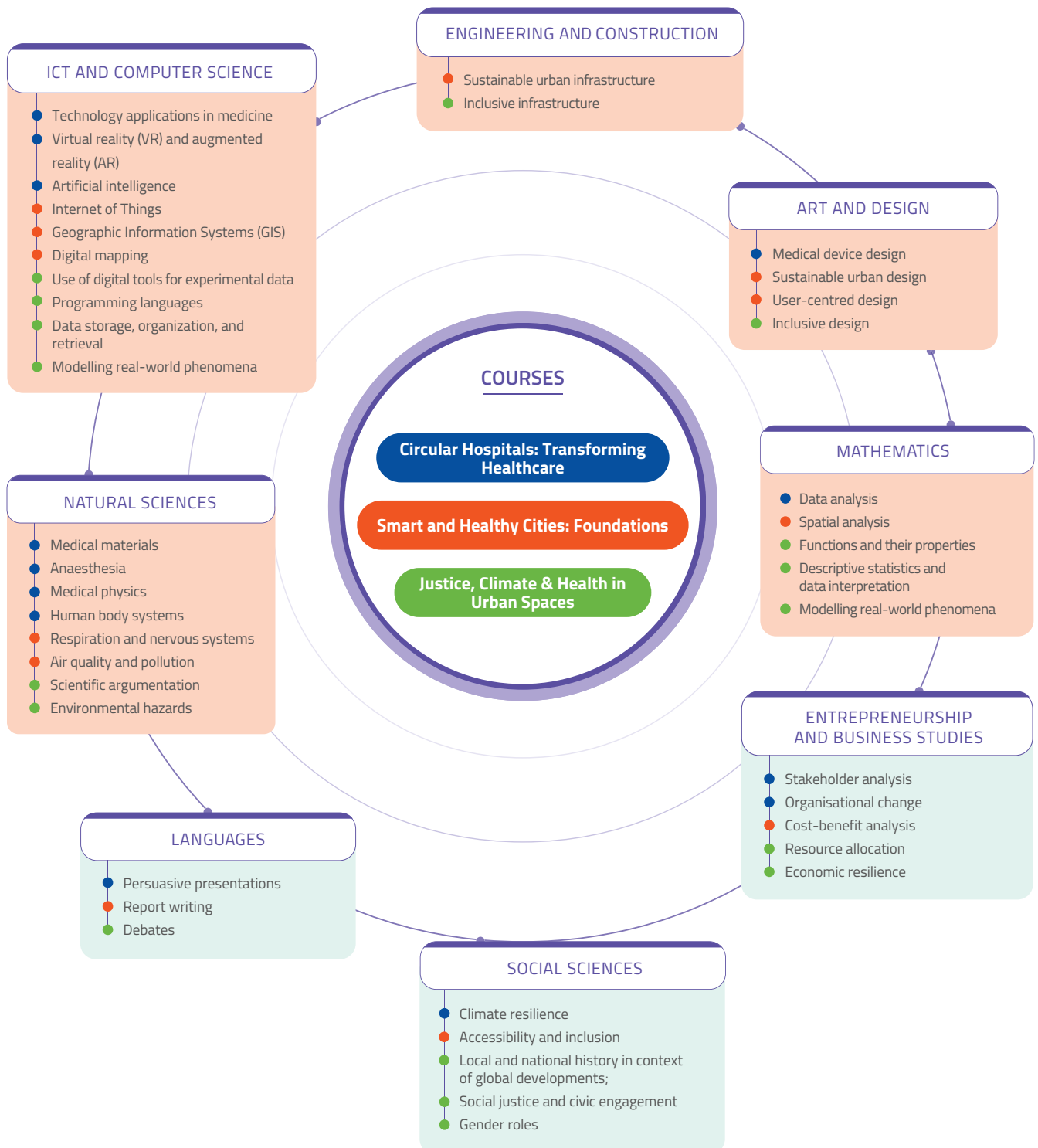
Learning Pathway 7

Food for the Future



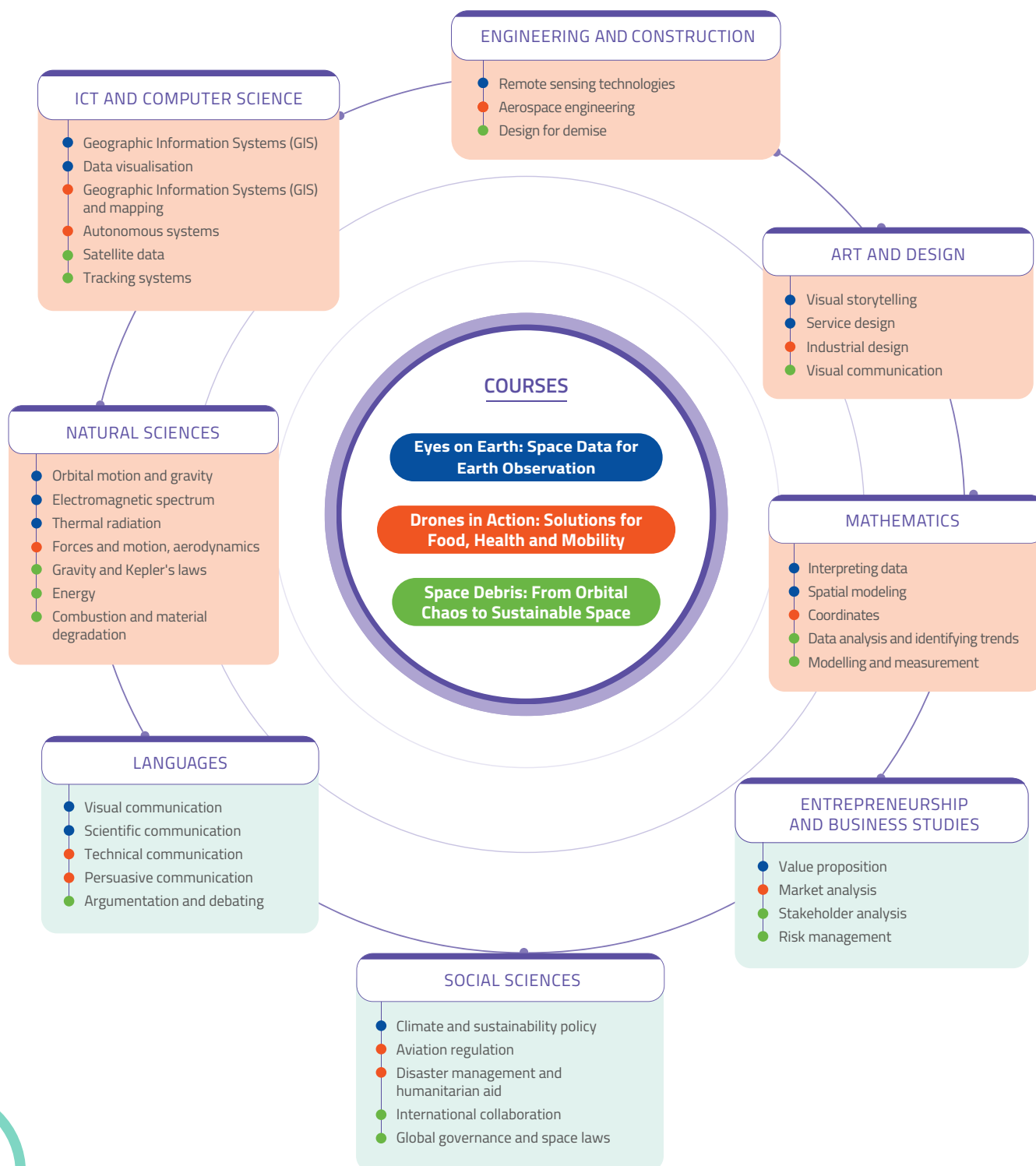
Learning Pathway 8

Building Healthy Futures



Learning Pathway 9

Sky, Space and Beyond



COURSE CATALOGUE

A **one-page overview** of each of our **thematic courses** is provided here to help you consider how the programme can be integrated into your teaching sessions. This summary is designed to give you a clear snapshot of each course's focus and objectives.



THE FUTURE OF ROBOTICS AND THE CIRCULAR ECONOMY

Learning Pathway: Systems and Industries of Tomorrow

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course is designed to introduce students to robotics and their role in shaping the manufacturing industry and society itself.

It invites students to find out more about cutting edge robotics research and to investigate real case studies demonstrating the impact and benefits of robotics.

It explores key innovations such as collaborative robots, cognitive twins and machine learning.

The course will enable learners to:

- Examine different types of robotics and better understand how robotics can support the circular economy through efficiencies in resource use, maintenance and disassembly
- Recognise how AI and augmented reality can support robotics to revolutionise the manufacturing industry
- Demonstrate skills in using digital mapping tools to collate and manage research
- Apply research and resources found to imagine the future of robotics, drawing on case studies and innovators of today

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- What is Robotics?
- Robotics and AI
- Robotics in the Manufacturing Industry
- Key developments in industry
- Changing roles at work

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long.

Working in teams, students will engage in a structured design thinking process resulting in making a pitch to a potential recycler in the form of a making a convincing presentation to their peers.

The challenge will include desk-based research to identifying the five key problems in the industry. This leads into defining a specific problem and exploring real-world solutions adopted by three companies to address the problem.

Technical Considerations

The course uses videos to support knowledge development and requires access in the skills challenge phase to:

- [Miro](#) or [Mural](#)
- [Prezi](#) or PowerPoint

CIRCULAR ECONOMY OF FOOD IN THE CITIES

Learning Pathway: Changing Consumer Lifestyles and Habits

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course provides an introduction to food waste and food loss reduction and offers opportunities to build and practice relevant and associated digital and entrepreneurial skills through a stakeholder's mapping challenge activity.

By jointly identifying key opportunities and stakeholders, students will assess the possibility of reducing food waste in their own school.

The course will enable students to:

- Discover who is responsible for tackling food waste in the city
- Describe how big data and machine learning might provide solutions to food waste reduction
- Consider and select optimal communication options from the range of digital possibilities Identify opportunities to reduce food waste in schools and understand the long-term impact of food waste reduction on the city

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum.

Content will include:

- Urbanisation and food consumption statistics
- Urban food system challenges and opportunities
- Key stakeholders in food systems
- Developing circular urban food systems

The Skills Challenge

Working in groups, students will be inspired by case studies and online examples focused on food waste reduction in cities ahead of identifying and assessing options for food waste reduction in their own school. The challenge will require problem identification and solution exploration which builds in the potential of big data and machine learning, culminating in a presentation to their peers.

The skills challenge is designed in 4 units, each 30 minutes long, and will enable the students to practice creativity, develop their entrepreneurial mindset, assess data, and consider how best to work with a range of stakeholders.

Students will benefit from working in a team context, detecting opportunities while adopting ethical and sustainable thinking. They will further develop skills in sharing information and content using digital technology.

Technical Considerations

YouTube links are used to support knowledge development in the knowledge acquisition phase of the course. The following tools are used in the skills challenge phase:

- [Miro](#)
- [Prezi](#)

THE CIRCULARITY OF SMARTPHONES AND HANDHELD DEVICES

Learning Pathway: The Hidden Life of Things Around Me

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course explores how smartphones are produced, their environmental impacts and social injustices.

It focuses on increasing e-waste, digital footprints and the future of smartphones and handheld devices.

Students will find out more about urban mining, modular phones and new business models which better support a circular economy.

The course will enable students to:

- Identify key sustainability issues in the smartphone and handheld device industry
- Discover how advanced materials, advanced manufacturing and urban mining will play a key role in recycling materials and creating long-lasting products
- Demonstrate skills in evaluating data, information and digital content to create a circularity ranking system and explain this system clearly through social media
- Develop a business plan designed to reduce handheld device consumption and increase recycling

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- The manufacture of smartphones and handheld devices
- Issues around production, use, waste and disposal
- Shallow vs. Deep Tech
- New business models

The Skills Challenge

Working in teams, students will evaluate and rank smartphone manufacturers circularity, before exploring new and more sustainable business models in the industry. At the end of the challenge, designed in 4 units, each 30 minutes long, students will ideate a social media advertisement for the most innovative circular smartphone business.

Technical Considerations

The course uses videos to support knowledge development and requires access in the skills challenge phase to:

- Social Media
- [Miro](#) or [Mural](#)
- [Prezi](#) or PowerPoint

E-WASTE AND THE CIRCULAR ECONOMY

Learning Pathway: Changing Consumer Lifestyles and Habits

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course focuses on e-waste as a societal problem. Drawing on key facts and figures, it will explore the impact of e-waste on health, the environment and the planet.

Students will explore challenges and opportunities associated with e-waste management, gaining understanding on how to balance technological advancement with environmental sustainability to assist in delivering a greener future for everyone.

The course will enable students to:

- Demonstrate an understanding of the environmental impact of e-waste and the consequences of not repurposing or recycling unused electronic devices
- Explain the role of blockchain in producing digital product passports, enabling life cycle tracking of electronic products
- Gain experience of using digital technology and generative AI tools to harvest and report on specific data sets
- Evidence ethical and critical thinking in decisions relating to the repurposing, recycling and reuse of electronic products

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- What is e-waste and e-waste recycling?
- E-waste in the home, and globally
- E-waste categories
- Environmental and health impacts
- Strategies to manage e-waste
- The concept of 'right to repair'
- Life cycle assessment and digital product passport

The Skills Challenge

Working in teams, students will use ChatGPT to identify key raw materials in an everyday product of their choice.

The skills challenge is designed in 4 units, each 30 minutes long. Students will develop a canvas showing the journey of three selected materials which form part of their selected product, focusing on factors such as distance travelled. They will share findings with their peers, gaining deeper understanding of how to undertake a life cycle assessment of everyday products.

Students will benefit from developing their ethical and sustainable thinking, in parallel with enhancing their ability to browse, search and filter data and to develop digital content.

Technical Considerations

The course uses videos to support knowledge development and requires access in the skills challenge phase to:

- [ChatGPT](#)
- [Canva](#)

RETHINKING PLASTICS

Learning Pathway: Circular Life of Materials

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Plastics are amazing materials that have found their way into all parts of our lives. But they are not the most environmentally friendly solution. Is it time to completely rethink and reduce our use of plastics?

This course looks at possible solutions for tackling the global plastic waste crisis. It will introduce students to the benefits and challenges of plastic use.

It explores innovative solutions for reducing reliance on plastics, including as an individual consumer.

The course will enable students to:

- Demonstrate an understanding of the environmental impact of plastic waste and sustainability principles - reducing, reusing, and recycling
- Apply basic knowledge of advanced materials science to identify practices and technologies used in plastic recycling and upcycling
- Engage in citizenship by creating digital content that raises awareness and promotes sustainable practices in plastic usage
- Consider how best to mobilise individuals and groups to reduce their plastic waste

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Identifying the plastics problem
- Consumer behaviours
- EU strategies
- Pioneering plastics recycling practices and pioneers
- Plastic packaging and innovative solutions

The Skills Challenge

Working in teams, students will have the opportunity to focus on single use plastics in the school canteen.

The skills challenge is designed in 4 units, each 30 minutes long. Activities will include adopting specific roles to explore different perspectives, undertaking background research to inform arguments for/against the removal of single use plastics based on the role adopted, and engaging in a debate.

This will be followed by discovering how to calculate and reduce plastic footprints, encouraging behavioural change in the individual student and their network through the creation of a social media post.

Students will have the opportunity to share creative ideas, thinking through how to mobilise themselves and others into action.

Technical Considerations

The course uses videos to support knowledge development and requires access in the skills challenge phase to:

- Social Media
- [Plastic Footprint Calculator](#)
- [Google Maps](#) or equivalent

NAVIGATING DIGITAL LIFE: FROM SAFETY TO SUSTAINABILITY

Learning Pathway: Discover Digital

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

In this course students will learn how to stay safe online while protecting the planet. They will explore hacking, AI, IoT, and digital footprint, and discover how own online actions impact privacy and the environment. Through videos, interactive exercises, and teamwork, students will practice creating strong passwords, spotting phishing, and using smart security habits.

The course will enable students to:

- Identify circular economy ideas in cybersecurity topics like hacking, AI & IoT, and digital footprints and reflect on values related to privacy and responsible technology use
- Explain how using practicing aspects of the Internet of Things can support sustainable cybersecurity by addressing challenges related to hackers, AI and IoT, and digital footprints
- Develop awareness and adopt new behaviors when using different devices or web services to improve overall user safety
- Acquire an understanding of the development phases of a start-up team and the strategic motivations behind each stage

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long.

The content includes:

- Staying safe online: creating strong passwords, spot phishing
- Understanding hackers, AI, IoT, and personal digital footprint
- Online actions and their impact on privacy and the environment
- Practicing responsible, sustainable cybersecurity habits

The Skills Challenge

This part of the course is organised in 4 learning units, each 30 minutes long.

Students will dive into the process of launching a cybersecurity start-up. Students will roadmap decisions and create a cybersecurity checklist, which would include responsible and sustainable cybersecurity practices, from using public Wi-Fi to choosing secure passwords and spotting scams.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Canva](#), [Figma](#), [Google Slides](#) or another collaborative tool

UNLOCKING FASHION CIRCULARITY

Learning Pathway: The Hidden Life of Things Around Me

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

The course provides an overview of the fashion industry cycle – design, production, use and end of life – and presents examples of how Deep Tech is being developed to reduce, manage, and eradicate some of the fashion industry's biggest environmental challenges such as waste, throwaway culture and pollutants.

The course will inspire students to take individual consumer action to reduce clothing consumption while retaining a creative and fun approach to fashion as an expression of their personalities.

The course will enable students to:

- Investigate linear and circular supply chains and envision what the future could be like for a circular fashion industry
- Identify deep tech solutions to fashion industry issues which might reduce consumption, improve consumer experience and increase circularity, including AI, 3D Printing and virtual reality
- Analyse and create business social media profiles and posts designed to celebrate circular economy concepts
- Apply deep tech ideas and sustainable thinking to envision a desirable future and innovative business models that could revolutionise the fashion industry

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes, designed to fit into the school curriculum. Content will include:

- Current linear fashion production, use and disposal practices
- Supply chain hotspots
- Circular fashion
- Redesigning the fashion industry

The Skills Challenge

Working in teams, students will create a social media campaign focused on a problem they have identified in the fashion industry.

The task will include problem identification, exploring how businesses use social media to target customers, and introducing the students to business models.

Students will benefit from working together, imagining a more desirable future which reflects ethical and sustainable thinking, while developing the ability to search for data and options for mobilising others into action.

Technical Considerations

The course uses videos to support knowledge development and also requires access in the skills challenge phase to:

- [Miro or Mural](#)
- [Prezi](#) or PowerPoint
- Social Media

A CIRCULAR APPROACH TO URBAN MOBILITY

Learning Pathway: Shaping the Cities of Tomorrow

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course is designed for students who are curious about making cities more liveable and sustainable.

Students will learn more about how cities have evolved and how transportation systems impact urban life.

The concept of sustainable mobility will be explored as students dive into real-world challenges like people vs cars, traffic congestion, pollution, and urban space inequity.

The course will enable learners to:

- Apply circular economy principles in the context of sustainable urban mobility systems
- Explore the role of deep tech innovations in addressing urban mobility challenges and enhancing sustainable transport solutions
- Develop digital competencies necessary for analysing and implementing sustainable mobility solutions using technological tools
- Cultivate entrepreneurial skills imagining innovative solutions, and creating value in the realm of sustainable urban mobility

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- How transport systems influence urban development and impact the quality of life
- The difference between traditional and sustainable mobility
- Challenges in urban mobility e.g. air quality, road safety
- Potential solutions to urban mobility challenges e.g. shared electric vehicles

The Skills Challenge

Working in teams, students will develop a plan to encourage sustainable travel to school, including suggestions for mobility modes, infrastructure improvements, technological innovations, and strategy recommendations.

The skills challenge is designed in 4 units, each 30 minutes long, and will engage students in reflecting on their own travel behaviours, exploring travel options, investigating environmental impact and considering how their travel mode affects their own independence and daily routines.

Students will develop skills in self-reflection, data browsing, searching and filtering, and the creative use of digital tools.

Technical Considerations

The course uses videos to support knowledge development and requires access in the skills challenge phase to:

- Digital calendar, Digital notes
- [Google Maps](#) or equivalent
- [Mentimeter](#)

METALS AND THE CIRCULAR ECONOMY

Learning Pathway: Circular Life of Materials

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course explores the role of metals in everyday life, reflecting on where they come from and how important they are for creating electronic devices, such as smartphones.

It focuses on the environmental and social impacts of metal mining, and the need to create a better balance between consumer demand and environmental protection.

It introduces traditional and modern recycling efforts, including urban mining as a way of harvesting valuable materials from waste and considers how to increase public awareness of the circular economy and its role in recycling and repurposing metals.

The course will enable students to:

- Demonstrate an understanding of the environmental and social impact of metal mining in the context of the circular economy
- Identify the importance of advanced manufacturing processes in metals recycling
- Use digital and audio-visual technologies for collaboration, mapping and reporting
- Evidence ethical and critical thinking in decisions relating to the recycling of products containing metals

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- What are metals?
- Different types of metals, e.g. rare earth and critical raw materials
- Environmental and social impacts of metal mining
- Recycling and recovery of metals – current practices
- Innovative solutions to metal recycling and recovery

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long. Working in groups, students will become the outreach team for a non-profit organisation seeking to promote metal recycling.

For each team, the task is to create a campaign video to inform and inspire the general public to get involved in metal recycling.

Students will work through specific steps – targeting their audience, creating a video storyboard and producing a campaign video.

Students will benefit from collaborating in a team context, identifying options, reaching agreement about the focus for their campaign, working together to create a product which will be shared with the other groups.

Technical Considerations

The course uses videos to support knowledge development and also requires access in the skills challenge phase to:

- [Miro](#)
- [ClipChamp](#)
- [Google Classroom](#) or equivalent

FROM SAND TO SYSTEMS: THE CHIPS OF MODERN ELECTRONICS

Learning Pathway: Circular Life of Materials

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Students will unravel how tiny slices of silicon transform electricity into the digital signals that power modern life. Through hands-on activities, interactive videos, real-world examples, and career spotlights students will learn why electron flow matters, how raw sand becomes a precision-engineered wafer, and what it takes to build a microchip from start to finish. Students will take part in a decision-making simulation, team up to design and pitch actionable strategies.

The course will enable students to:

- Recognise how semiconductor technologies enable digital innovation and drive sustainable development, assess companies' impact, identifying opportunities to enhance companies' circularity
- Explain how semiconductor materials and device architectures enable innovations in IoT
- Use digital data-visualisation tools to collect, map and interpret semiconductor production and impact metrics
- Collaborate in teams to design and pitch a sustainability roadmap for a semiconductor factory

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Students will learn how microchips power everyday devices, trace their journey from sand to silicon wafers, explore global material sources and production chains, and understand the impacts of manufacturing. Career spotlights throughout the course will reveal exciting roles in this industry.

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long.

Students will work in teams to co-create strategies for a new semiconductor plant. They will identify and debate environmental, social, and economic risks, prepare tough questions and responses from different stakeholder views, and deliver a persuasive pitch of their solutions to balance profit, community, and sustainability.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Padlet](#)

CIRCULAR THINKING IN THE WORLD OF VIDEO GAMES

Learning Pathway: Discover Digital

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Students will explore how gaming consoles and digital experiences impact the environment - and what we can do about it. Students will learn about the circular economy, AI, and how digital products can be reused, remixed, or redesigned instead of thrown away.

The course will enable students to:

- Identify circular economy principles relevant to gaming; challenge current practices and suggest steps toward a more sustainable future for video game consoles using AI technologies
- Describe how AI and machine learning are used in gaming, and explain how these technologies can support a more sustainable and circular digital economy
- Modify and integrate new content into existing games and environments using digital tools and AI; customise these environments in the context of circular economy and gaming
- Create better solutions to sustainability challenges in gaming; develop ideas collaboratively to support circular economy principles using video game consoles and AI

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long.

The content includes:

- How video game systems work
- Where are the biggest environmental impacts of videogames
- How circular thinking can make videogames better

The Skills Challenge

This part of the course is organised in 4 learning units, each 30 minutes long. Working together, students will reimagine classic games, remix real code and design bold new uses for outdated gaming hardware. Students will use interactive tools, collaborate in teams, and get creative with AI to turn old tech into future solutions. Students will gain digital, creative, and teamwork skills they can use beyond gaming.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [ChatGPT](#), [Craiyon](#), [Microsoft Designer](#), or [Adobe Firefly](#)
- [Code Editor](#)
- [CDR web-application](#)

SMART AND HEALTHY CITIES: FOUNDATIONS

Learning Pathway: Building Healthy Futures

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

The course aims to equip students with the essential knowledge and tools to understand how smart technologies can be leveraged to create smarter and healthier cities. Students will learn how these technologies can improve urban living conditions, promote well-being, and foster inclusivity. With a particular focus on the design of public space and opportunities for active travel, the course integrates digital innovation, gender perspective, sustainability, and social responsibility to help design cities that are not only technologically advanced but also healthier and more equitable for all their residents.

The course will enable students to:

- Recognise circular economy and sustainability principles in urban design, especially related to mobility, natural spaces, and well-being
- Apply digital tools to assess urban challenges and propose smart technology solutions for healthier, more inclusive cities
- Search, organise and analyse urban data related to health, mobility, and environmental sustainability to support design decisions
- Work in teams to assess and improve the design of a local street using inclusive and sustainable city planning principles

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Through this course, students will engage with key topics that are relevant to health and that can be addressed through smarter design and technology at the service of people's well-being. The course is organised around four themes:

- What defines a Smart City or Healthy City?
- Key Environmental Stressors
- Solutions for Healthier Cities
- Acknowledging the Gender Gap

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long.

Students will collaborate in teams to analyze a street in their neighborhood, assess its current design, and propose changes that would make it healthier, more sustainable, and inclusive. They will research various urban solutions, considering aspects like mobility, safety, and environmental impact, and then engage in debates with their peers to discuss and refine their proposals.

Students will benefit from collaborating in a team context, identifying options, reaching agreement, and working together to create a product which will be shared with the other groups.

Technical Considerations

- [StreetMix](#)
- [Canva or Miro](#)

BIOMANUFACTURING FOR A HEALTHY PLANET

Learning Pathway: Circular Life of Materials

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Students will explore how bio-manufacturing can reduce the environmental impact of the healthcare sector by examining how fermentation is driving new healthcare research and how bio-materials and AI can help tackle waste. Students will work in teams to re-imagine facemasks, a major source of healthcare pollution, by investigating existing solutions, designing for circularity, and considering how bio-manufacturing processes can support sustainable alternatives.

The course will enable students to:

- Define circular economy principles applied to bio-manufacturing
- Discuss aspects of advanced manufacturing which can support a circular healthcare system, such as precision fermentation and bio-materials
- Use digital communication and create digital content exploring circular aspects of bio-manufacturing and facemasks
- Reflect on goals for bio-manufacturing to support healthy planet and individual actions that can contribute

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long.

In this course, you will explore how bio-manufacturing could hold the key to reducing the healthcare industry's environmental impact.

The content includes:

- Fermentation as a driver for a new wave of healthcare research
- Precision fermentation
- How bio-materials and AI can tackle the problem of waste

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long.

Students will work in teams to re-imagine facemasks, a source of significant pollution in healthcare. They will investigate competitors and evaluate how facemasks could be designed for circularity, supported by bio-manufacturing processes. They will need to communicate the issue to the local community and prove their new product is truly circular by design!

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Miro](#) or alternative tool

LIFE CYCLE OF A PACK: HOW EVERYDAY CHOICES SHAPE THE PLANET

Learning Pathway: Food for the Future

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

In this course students will explore how food packaging affects the environment and how we can redesign it to be smarter, simpler, and more sustainable. This course is a starting point to understand how the food system works and why packaging plays such a big role in climate change. Students will learn how packaging protects food, helps reduce waste, but also creates serious environmental challenges. They will discover exciting innovations like mushroom foam containers, seaweed film, and AI tools that help companies use less packaging.

Students will explore the basics of the circular economy and Life Cycle Assessment (LCA) to explore the full journey of a food package, from materials to disposal. In teams, students will tackle a real packaging problem and redesign it using simple tools and creative thinking.

The course will enable students to:

- Recognise how the circular economy applies to food and packaging systems and understand the stages and sustainability impacts of agrifood chains
- Identify real-world examples of deep tech in food packaging, such as smart labels and AI tools for waste reduction

- Use online collaboration tools to map packaging impacts and share sustainability ideas in a group challenge
- Co-create a packaging redesign that solves a real problem and reflect on its value and environmental impact

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content includes:

- Food systems, packaging and its impact on the planet
- Sustainable packaging
- How innovation and technology can reduce waste
- Life Cycle Assessment tool and how to use it

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long.

In teams, students will tackle a real-world food packaging problem. They will explore a product scenario, use Life Cycle Assessment (LCA) to analyze environmental impact, and redesign the packaging using eco-materials and smart tech. Then, they will pitch their solution and reflect on how small changes can lead to big impact.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Padlet](#), [Miro](#) or any other joint collaborative board

FEEDING THE FUTURE: TECH SOLUTIONS FOR FOOD SECURITY AND SAFETY

Learning Pathway: Food for the Future

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Students will learn the difference between food safety and food security, explore the four pillars of food security, and examine how technologies such as AI, smart sensors, and blockchain can address food-related challenges. Working in teams, students will analyse real-world food security problems and relevant startups, develop innovative deep tech solutions, and present how their ideas can make food systems safer and more secure.

The course will enable students to:

- Recognise how circular economy applies to food security and food safety; understand the pillars of food security
- Identify the real-world examples of deep tech solutions improving food safety and security
- Use online collaboration tools to search and organize data that can be applied to solving food safety and food security issues
- Ideate improvements to existing tech solutions and adjust them to the principle “think globally, act locally”

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long.

Students will learn the difference between food safety and food security and how they are connected.

The content includes:

- Four pillars of food security; difference between food security and food safety
- How technologies like AI, smart sensors and blockchain can help tackle food-related challenges
- How Circular economy applies to the food security and safety
- Recognising risks and thinking systemically about solutions

The Skills Challenge

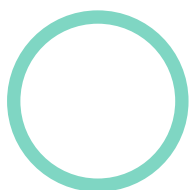
The skills challenge is designed in 4 units, each 30 minutes long.

Students will work in a team to explore food security challenges, choose a real-world problem, and match it with an innovative deep tech solution. Students will analyse startups, develop ideas to improve their impact and present how our solution makes food systems safer, more secure, and sustainable. Through the team activities, students also will give and receive peer feedback.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Miro](#)



HEALTHY SOIL, HEALTHY PLANET, HEALTHY HUMAN

Learning Pathway: Food for the Future

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

Through this course students will recognise the importance of soil processes and you learn how to support healthy soils via ecological principles and technical innovations.

The course will enable students to:

- Recognise how circularity applies to soil processes and understand why these soil related ecosystem services are essential for our daily lives/needs
- Give examples of how healthy soil ecosystems can be created/ regenerated
- Participate in soil science by predicting the effects of ecological and technological management practices on soil health
- Co-create a local regenerative farming system

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content includes:

- how soil life drives ecosystem processes and how we can restore soil function
- how technology support farmers
- soil science and regenerative farming

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long. Working in teams students will co-create a regenerative farm in which ecological principles and technological innovations are implemented to tackle the local soil challenges the team has identified.

The students will go through 4 steps:

- Creating the vision for the farm
- Researching local soil challenges
- Identifying biodiversity & circularity boosters
- Co-creating smart farming

Students will benefit from collaborating in a team context, identifying options, reaching agreement, and working together to create a product which will be shared with the other groups.

Technical Considerations

The course uses videos and few external links to support knowledge development. The following tools are used in the skills challenge phase:

- [Canva](#)
- [Miro](#)

THE POWER OF ADVANCED MATERIALS

Learning Pathway: Circular Life of Materials

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course explores the world of advanced materials—the use of intentional engineering that enables everything from foldable screens to vanishing packaging. Students move from passive users to “Material Hackers,” learning to re-engineer everyday products with advanced materials by balancing high-performance tech with circular sustainability.

The course will enable students to:

- Learn about advanced materials and identify failure gaps in everyday products, proposing solutions to boost both performance and sustainability.
- Navigate professional database to identify material properties and recycling potential.
- Illustrate how engineered materials support sustainable design over traditional ones
- Create value by pitching material innovations for a circular economy

Building Knowledge

This part of the course is organized in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Understanding what advanced materials are and where can we find them
- The sustainability dilemma of advanced materials and discovery of a digital library of materials

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long, and takes teams through a process of “material hacking” across four structured phases: 1. Assessment: Audit an everyday product to identify material failures. 2. Material Swap: Navigate an online database to find an advanced material replacement. 3. Impact Mapping and Scripting: Weigh performance gains against circularity and start scripting your pitch. 4. Pitch: Present the re-engineered solution, demonstrating how the “swap” supports a sustainable society and analyze results of other innovation projects..

Technical Considerations

YouTube links are used to support knowledge development in the knowledge acquisition phase of the course. The following tools are used in the skills challenge phase:

- [MaterialDistrict Database](#): A professional digital library for material discovery. (Also used in Learning Unit 2)
- [Canva](#) for presentation deck (not mandatory)

SPACE DEBRIS: FROM ORBITAL CHAOS TO SUSTAINABLE SPACE

Learning Pathway: Sky, Space and Beyond

Course Level

Foundation

Course Structure

- 1 hour structured learning
- 2 hours skills challenge

Course Overview

This course introduces students to the growing challenge of space debris and the need for sustainable space activity. Through real-world examples, visual tools, and teamwork, students explore how satellites support life on Earth, why Earth's orbit is becoming increasingly crowded, and what can be done to reduce risks in space and during atmospheric re-entry.

The course will enable students to:

- Analyze problems of space debris and re-entry and their impact on sustainability; identify risks and impacts on space and ground systems.
- Use digital tools to evaluate risks and propose solutions for sustainable space operations.
- Recognise and describe innovative tech solutions that enable sustainable space debris removal and safe atmospheric re-entry.
- Design and justify long-term sustainable space policy with strategic priorities, practical solutions, and monitoring methods.

Building Knowledge

This part of the course is organised in 2 learning units, each 30 minutes long, designed to fit into the school curriculum. Content include: what space debris is; how debris is tracked and why collisions matter; how satellites support everyday life on Earth; what happens during atmospheric re-entry; how debris removal missions and sustainable spacecraft design can contribute to safer space operations.

The Skills Challenge

The skills challenge is designed in 4 units, each 30 minutes long, and is designed for teamwork. It encourages critical thinking, the evaluation of innovative technological solutions, and the development of strategic priorities and practical actions around the key question: Space traffic: can we keep space sustainable? Working in teams, students will: identify real risks linked to increasing space activity; analyse impacts on space, Earth, and society; explore real data; design a practical sustainability plan; and present and justify their proposed solutions.

Technical Considerations

YouTube links are used to support knowledge development in the knowledge acquisition phase of the course. The following tools are used in the skills challenge phase:

- [Miro](#) shared board
- Power point presentation
- [Canva](#) presentation

URBAN FUTURES: BUILDING THE CITIES OF TOMORROW TOGETHER

Learning Pathway: Shaping the Cities of Tomorrow

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This course will enable students to gain a comprehensive understanding of circular city principles in the context of climate change and will support the development of practical skills in sustainable urban development.

Through interactive projects and collaborative activities, students will gain insights into how cities can be transformed to better support our planet and its inhabitants.

The course will enable learners to:

- Explore sustainable solutions such as adaptive reuse of buildings, innovative materials, and efficient resource management
- Appraise the transformative potential of advanced technologies in urban sustainability, such as, Building Information Modelling
- Demonstrate proficiency in digital skills by collaboratively using digital tools to create detailed urban sustainability projects
- Develop entrepreneurial competencies and the ability to identify and address potential risks and ethical concerns in their proposed solutions

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Population crises and the environmental impact of cities
- Sustainable innovations in cities
- Innovative building materials
- The impact of nature in cities

The Skills Challenge

The skills challenge is designed in 6 blocks – 30 minutes each. Working in teams, students will create and then pitch to their peers a prototype of a concept focused on urban sustainability.

The process will include adopting co-generative strategies with key stakeholders and ideating options. AI will be used to help generate materials and to create engaging presentations which bring ideas to life.

The challenge will foster skills in goal setting, mobilising resources and collaborating with others to leverage diverse perspectives and expertise.

Technical Considerations

Knowledge acquisition will be supported through videos including TedTalks. In the skills challenge phase, the course also requires access to:

- [Miro](#)
- [Canva](#)
- AI Chatbot

BEYOND RECYCLING: CREATING SUSTAINABLE CONSUMPTION

Learning Pathway: Changing Consumer Lifestyles and Habits

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This course asks two important questions. Is recycling enough to truly live sustainably? How can we ensure our decisions positively impact our communities?

To answer these questions, the course deep dives into the exciting world of "Circular Consumption". It explores how our individual choices affect both the planet and our communities and examines the material and social impacts of the things we use every day.

Students will have the opportunity to embrace sustainability values and to confront complexity in being sustainable. They will then devise creative, informed solutions, advancing their skills in gathering and managing resources and proposing considered action.

The course will enable learners to:

- Apply circular economy principles to environmental challenges
- Appraise the transformative potential of Blockchain technology in tackling environmental issues
- Create prototypes and presentation materials for their sustainable solutions
- Develop entrepreneurial competencies and skills in pitching ideas

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Exploring the complexities of circularity
- Learning about the carbon tunnel vision
- The impact of industrial activities
- Blockchain technology and urban symbiosis
- The social effects of consumerism

The Skills Challenge

The skills challenge is designed in 6 blocks – 30 minutes each. Working in teams, students will be introduced to and employ design thinking methodology. They will agree on a common topic, create archetypes of users impacted by their chosen issue, gaining insight into user perspectives.

This will be followed by the idea generation and refinement, ahead of designing a prototype and pitching their proposal for change.

The skills challenge will foster creativity and critical thinking, empowering learners to become effective communicators and problem-solvers.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Miro](#)
- [Canva](#)
- AI Chatbot

ARTIFICIAL INTELLIGENCE AND THE CIRCULAR ECONOMY

Learning Pathway: Discover Digital

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

On the brink of the 4th Industrial Revolution, this course explores how cutting-edge technology can drive sustainable practices.

It will develop students' understanding of Artificial Intelligence (AI) and its various applications, exploring how it can transform both industries and communities.

Specifically, the course focuses on how AI can be used to revolutionise how we think about and manage waste and scarce resources.

The course will enable students to:

- Engage with the basics of AI and its applications
- Discover AI's use in the circular economy
- Get hand-on experience with innovative AI tools
- Develop creative solutions to sustainability issues

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Defining AI and basic terms
- AI and its potential in the field of sustainability
- Responsible AI development and deployment
- Ethical considerations

The Skills Challenge

The skills challenge is designed in 6 units, each 30 minutes long, and takes teams through a product design process from planning, investigating, designing, building, and applying through to dissemination of the product to peers.

Working in teams, students will collaborate using AI techniques to design a product that minimises waste, increases efficiency and optimises resource use.

Students will benefit from working in a team context, co-operating with others and learning to resolve conflicts and manage competition positively.

Technical Considerations

YouTube links are used to support knowledge development in the knowledge acquisition phase of the course.

The following tools are used in the skills challenge phase:

- [Microsoft Copilot](#)
- [Looka](#)
- [Canva](#)
- [ChatGPT](#)

SMART SCHOOL GARDEN

Learning Pathway: The Hidden Life of Things Around Me

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This course creates the opportunity for students to dive into the concept of Living Labs, real-life environments like school gardens where learners, teachers, and community members come together to experiment, innovate, and co-create solutions for a circular food system.

Students will imagine their school garden as a Living Lab where they can grow food, learn about sustainability, and make a real impact on reducing food waste.

They will explore how advanced technologies like big data, machine learning, and Internet of Things (IoT) can transform gardening into a high-tech adventure, making it more efficient and sustainable.

The course will enable students to:

- Analyse interconnections between different elements of the food value chain
- Identify how advanced technologies e.g. big data and machine learning can inform app development
- Use various digital tools to support their collaboration on creating and launching a mobile app
- Operate effectively in a team, creating a map of stakeholders needed for successful adoption of a digital tool

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Exploring the importance of systems thinking in understanding complex issues and finding solutions
- Investigating the food system and its component parts
- Living Labs in circular food systems
- The school as a Living Lab
- Vertical Urban Farms

The Skills Challenge

The skills challenge is designed in 6 units – each 30 minutes long. Working in teams, students will be challenged to create an app designed to manage an aspect of a school garden.

Inspired by international case studies, as the first stage in the app development, they will create a mind map designed to monitor a smart school garden, seeking out and making sense of data of particular importance in their school.

Final challenge activities focus on releasing and promoting the app, thinking through how best to gather support for their smart garden ideas.

Technical Considerations

The course requires online access for case study analysis, and the following tools:

- [Miro](#)
- [Google Docs](#)
- [Glide](#)
- [Logic Balls](#)

CIRCULAR HOSPITALS: TRANSFORMING HEALTHCARE

Learning Pathway: Building Healthy Futures

Course Level

Advanced

Course Structure

- 2 hour structured learning
- 3 hours skills challenge

Course Overview

This course focuses on hospitals as important spaces for sustainable action and innovative practice. It recognises that reducing waste, reusing materials and recycling resources both minimise environmental impact and can enhance the efficiency and resilience of healthcare systems.

It adopts a particular focus on the field of anaesthesia and the potential for deep tech to facilitate change, supporting the development of climate neutral hospitals.

The course will enable students to:

- Design and implement practical solutions for transitioning hospitals to climate-neutral operations
- Evaluate the environmental impact of deep tech solutions such as AI and Augmented Reality in hospital settings
- Visualise data from digital monitoring systems to identify trends, inefficiencies, and opportunities for reducing the environmental impact of hospital activities
- Evaluate the economic feasibility of green initiatives drawing on Europe-wide examples

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- Application of the Nine Rules of the Circular Economy within the hospital context
- Familiarisation with the tasks and challenges of an anaesthetic department
- Investigating the potential of Deep Tech as a support system in anaesthetics
- Exploring the affordances of AI in the anaesthetic department

The Skills Challenge

The skills challenge is designed in 6 units – each 30 minutes long. Working in teams, students will prepare a roadmap identifying short, mid- and long-term measures required to support the development of a circular hospital. Focusing particularly on the anaesthetic department, the teams will begin by analysing a patient's journey, considering the integration of Deep Tech solutions to identified hotspots. The challenge culminates with a pitch to their peers.

Technical Considerations

The course requires access to video material to support knowledge acquisition and to the following tools:

- AI Chatbot
- [Miro](#)
- [Prezi](#) or PowerPoint

FUTURE MOBILITY: TECHNOLOGY, ETHICS AND SUSTAINABILITY

Learning Pathway: Shaping the Cities of Tomorrow

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This course is designed for students who are curious about the future of transportation and who want to be at the forefront of innovation.

It provides advanced understanding of sustainable urban mobility, emphasising the integration of deep tech solutions like AI, Internet of Things (IoT), and machine learning. It offers students opportunities to explore ethical considerations, career pathways, and hands-on problem-solving activities through a comprehensive and interactive learning experience.

The course will enable learners to:

- Understand how technological trends like Automation, Connectivity, Electrification, and the Sharing Economy enable sustainable urban mobility to shape green cities of tomorrow.
- Analyse how deep tech such as Artificial Intelligence (AI) and Internet of Things (IoT) shape autonomous mobility systems and address urban transportation challenges.
- Use digital tools to collaborate and develop digital content related to sustainable mobility and critically evaluate information through SWOT analysis.
- Build creativity and initiative by designing innovative solutions to real-world mobility challenges through collaborative projects, culminating in a startup pitch.

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Content will include:

- An introduction to technologies shaping the future of sustainable urban mobility
- The benefits and challenges of autonomous vehicles
- Exploration of ethical concerns and dilemmas e.g. passenger safety vs pedestrian safety
- Environmental and social issues e.g. electrification and battery mining
- Career paths and leadership examples

The Skills Challenge

The skills challenge is designed in 6 units – each 30 minutes long. Working in teams, students will be challenged to devise a solution to an identified problem, culminating in a pitch to their peers.

The skills challenge takes students through a structured process beginning with problem identification in a selected market opportunity. Each team will generate ideas for the minimum viable product, mocking up their solution to visualise key design features.

Students will develop skills in creative thinking, taking the initiative and planning, assessing needs that can be addressed with digital solutions.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Miro](#)
- [Prezi](#) or PowerPoint

JUSTICE, CLIMATE & HEALTH IN URBAN SPACES

Learning Pathway: Building Healthy Futures

Course Level

Foundation

Course Structure

- 2 hour structured learning
- 3 hours skills challenge

Course Overview

This course deepens students' understanding of urban health, environmental justice, and climate resilience. It explores complex challenges like climate change, gender equity, and social inclusion through an integrated approach combining scientific tools, policy analysis, and community engagement. Students will learn to analyze urban environments, assess health impacts, and design inclusive, sustainable, and climate-resilient interventions.

The course will enable students to:

- Recognise the impact of climate change on urban health, emphasizing the need for sustainable urban design solutions that promote environmental justice, health, and well-being in the face of climate challenges
- Apply advanced digital tools to assess urban health risks and develop smart, climate-resilient solutions that enhance the quality of life in cities while addressing environmental stresses
- Search, organise, and analyse urban health, mobility, and environmental data using R programming to support decision-making and design urban interventions that promote health equity and sustainability
- Collaborate with diverse teams to co-create innovative, sustainable urban solutions that integrate environmental, health, and social equity principles, fostering healthier, more inclusive cities

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum. Students will learn about:

- Urban health challenges linked to climate and social justice
- Gender, equity, and environmental impacts in urban contexts
- Tools like Health Impact Assessment and monitoring techniques
- Design of inclusive, sustainable interventions for healthier, climate-resilient cities
- Systems thinking and policy evaluation

The Skills Challenge

The skills challenge is designed in 6 units, each 30 minutes long.

Students will work in teams to analyze a neighborhood's urban environment and its health and climate challenges. Using real data and scientific tools, students will design and propose inclusive interventions that improve health, reduce environmental risks, and promote equity. Students will present their plan, assess its impact, and debate with peers to refine their solutions.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [RStudio](#)
- [Canva](#) or [Miro](#) or [Streetmix](#) or alternative co-design tools

PLANET-FRIENDLY PACKAGING LAB

Learning Pathway: Food for the Future

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

In this advanced module, students will step into the role of eco-innovators to redesign how cereals and other everyday foods are packaged, protected, and transported. Building on the course foundation course Life Cycle of a Pack: How Everyday Choices Shape the Planet, students explore deeper life cycle thinking, ideas from nature like biomimicry, and use digital tools to measure environmental impact.

In teams, students will solve real problems from the food industry, design smarter, circular packaging prototypes, and pitch their solutions.

The course will enable students to:

- Assess environmental impacts of food packaging through Life Cycle Thinking, and apply circular economy principles to create regenerative, low-waste solutions
- Explore and integrate deep tech innovations into food packaging systems for increased sustainability and performance
- Use digital tools (e.g. LCA templates, collaborative boards, prototyping software) to communicate, evaluate, and iterate packaging ideas in a visually compelling way
- Co-create and pitch sustainable packaging solutions in a team setting, navigating ambiguity and connecting ideas with real-world needs and opportunities

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum.

The content includes:

- Food packaging and how it affects our planet
- How nature solutions like biomimicry can inspire smarter tech solutions
- Circular economy principles and Life Cycle Assessment (LCA) tool

The Skills Challenge

The skills challenge is designed in 6 units, each 30 minutes long.

Students work in teams to redesign how cheese is packaged, shipped, and stored. Using biomimicry, circular design, and smart tech, they will tackle real-world flaws like food waste, sweaty packs, and plastic overload. Students will prototype a new solution, evaluate it with LCA tools, and pitch their idea for a better food future.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Padlet](#), [Miro](#) or any other joint collaborative board

THE CHIP LAB: ADVANCED SEMICONDUCTORS & SYSTEMS

Learning Pathway: Systems and Industries of Tomorrow

Course Level

Foundation Level

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This advanced course explores how semiconductors connect with the big questions of our time, like climate change, global politics, and the future of tech careers. Students will dive deeper into how chips are designed, built, and used, and what it takes to make them more sustainable, ethical, and secure.

The course will enable students to:

- Identify and explain circular economy principles by mapping the lifecycle of semiconductors, investigating e-waste and sustainability challenges
- Analyze current and future trends in semiconductor innovation (e.g., Moore's Law, quantum computing, IoT) and propose how deep technologies can be applied to solve real world problems sustainably
- Gather, organize, and present information using digital tools (e.g., slides, posters, boards), showing their understanding of the semiconductor supply chain
- Work collaboratively to identify supply chain problems, co-develop solutions, and communicate their ideas clearly

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long, designed to fit into the school curriculum.

Students will learn how semiconductors are connected to global challenges like climate change, supply chains, and digital rights. Students will explore deep-tech chip innovations, EU policy, circularity strategies, and discover how real-world decisions shape the tech that powers our lives. The career spotlights will showcase the industry workforce and scope.

The content includes:

- Cutting-edge innovations like AI chips and biodegradable materials
- How international policy and global supply chains shape who gets access to technology
- Surprising career paths across science, design, and policymaking
- Real-world challenges, recycling systems and tech policies

The Skills Challenge

The skills challenge is designed in 6 units, each 30 minutes long.

Students will work in teams to research real-world challenges in the semiconductor industry, from energy use and e-waste to ethical labor or data privacy. Students will explore real examples, brainstorm creative solutions, evaluate their impact and explore related careers. Students will showcase their work in a final presentation and mini career expo.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Padlet](#)

DESIGNING FASHION CIRCULARITY

Learning Pathway: Systems and Industries of Tomorrow

Course Level

Advanced

Course Structure

- **2 hour structured learning**
- **3 hours skills challenge**

Course Overview

This advanced course explores the environmental impact of fast fashion on the planet and the potential for the circular economy to reduce this impact. The students will explore the world of circular fashion principles and deepen their understanding of what makes fashion design sustainable. In the challenge, students will work as a team to apply all their circular design knowledge to envision a new circular product and create their own Digital Product Passport.

The course will enable students to:

- Assess a variety of circular design principles including zero-waste and explore connections to a range of recycled, regenerative and next-gen materials
- Examine how biomimicry and additive manufacturing such as 3D printing can support creating a more circular fashion industry
- Develop digital content marketing and organise data in the context of Digital Product Passports
- Evaluate circular fashion service business models and develop an idea for a new circular fashion product

Building Knowledge

This part of the course is organised in 4 learning units, each 30 minutes long.

The content includes:

- The world of modular design; future materials inspired by nature
- Technologically enabled zero-waste opportunities
- Deep-tech innovations revolutionising the fashion industry such as additive manufacturing, blockchain and AI

The Skills Challenge

The skills challenge is designed in 6 units, each 30 minutes long.

Students will work in teams to develop a new circular product. Through researching competitors and collaborators, they will co-create a marketing post and a Digital Product Passport which takes the user through every step of the circular product lifecycle.

Technical Considerations

The course uses videos to support knowledge development and requires access to:

- [Canva](#)
- [Miro mindmap](#)

PROJECT CONSORTIUM

[Girls Go STEM](#) is an [EIT Community](#) initiative coordinated by [EIT RawMaterials](#) with the support of the European Union. It was launched in 2020 to support Action 13 – Encourage women's participation in STEM of the European Commission's [Digital Education Action Plan](#) and contribute to reducing the gender gap in STEM and ICT.

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