

Erasmus+: Enriching lives, opening minds

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Erasmus+ Programme  
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**HUMAN  
RESOURCE  
DEVELOPMENT  
CENTRE**

Project web-site: [www.digit-biotech.eu](http://www.digit-biotech.eu)

The Digit-BioTech project has been funded with support from the European Commission. This brochure reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

**DIGIT~Bio~TECH**



2019-1-BG01-KA203-062371

## THE BACKGROUND

*May you live in interesting times.*

*Chinese proverb/curse*

## THE TIMES WE LIVE IN

We live in the Age of Biology and Biotechnology when the humanity relies on the scientific and technological progress in life sciences to fight against global challenges, such as depletion of resources, food scarcity, climate change and old and new diseases.

In order to tackle these problems, highly qualified professionals are needed – professionals with strong knowledge, adequate skills, and flexible disposition, and on top equipped with digital skills that are a necessary element in every human endeavour of today.

Thus, the humanity will depend on teachers and tutors in the higher educational system in their complex roles as problem settlers, consultants, and analysts. The new-century education is a collaborative process – the educators in collaboration with the students, are the ones that shape the assessment, diagnose student's learning needs, and mediate learner experiences through the creation, discovery and adaptation of the training content.

## WHAT IS BIOTECHNOLOGY?

Biotechnology is a broad range of technologies that:

- Employ living organisms or parts of them to make other products: drugs and therapeutics, nutritional compounds, environmentally friendly chemicals and materials, biofuels, and novel functional materials.
- Can be employed to degrade toxic or harmful chemicals and agents to solve environmental problems.
- May help address many global problems, such as climate change, aging society, food security, energy security and spread of infectious diseases.
- Play an increasingly important role in our everyday life.
- Is used in healthcare, agriculture and industry to meet life's greatest needs.
- Offer enormous benefits but also present risks and challenges that have to be addressed through dialogue among stakeholders including policy makers, experts, the public, and NGOs.



## THE TRANSFORMING POTENTIAL OF ICT

In the last decades, information and communication technologies (ICT) have successfully transformed many fields of the human activity:

- **The education:** the ways students learn, act, react, and perform; and the ways educators teach, train, and assess;
- **The industry:** how companies research, plan, produce, interact, market, and distribute; and how customers reach for, choose, and buy;
- **The job market:** the channels employers use to seek, advertise job offers and recruit; and the channels employees use to search, self-promote, and accept a job offer.

- **The everyday life:** the ways people eat, move, drive, play, interact; and how people choose, produce, entertain.
- **The environment:** the ways the humanity explores, employs, saves and sustains natural resources.

### BIOTECHNOLOGY AND ICT: THE OPPORTUNITIES

- ICT are embedded into many new biotechnological processes, products, etc.
- Biotechnology and ICT may help reduce and prevent the negative impacts on the environment and health in the future.
- Biotechnology and ICT provide support to the sustainable technology development.






### ...AND THE CHALLENGES

- A shortage of highly qualified bioinformaticians.
- Inadequate knowledge of informatics/maths by biologists.
- Ineffective understanding of the end use of biology and biotechnology data by mathematicians and software engineers.
- Competence gap between computer science and biological sciences.

### HOW DO WE – AT THE DIGIT-BIOTECH CONSORTIUM – ENJOY THE ADVANTAGES AND ADDRESS THE CHALLENGES?

*“Bad times have a scientific value. These are occasions a good learner would not miss.”*  
*Ralph Waldo Emerson*

The Digit-BioTech takes the opportunity to broaden horizons in biology and biotechnology education through:

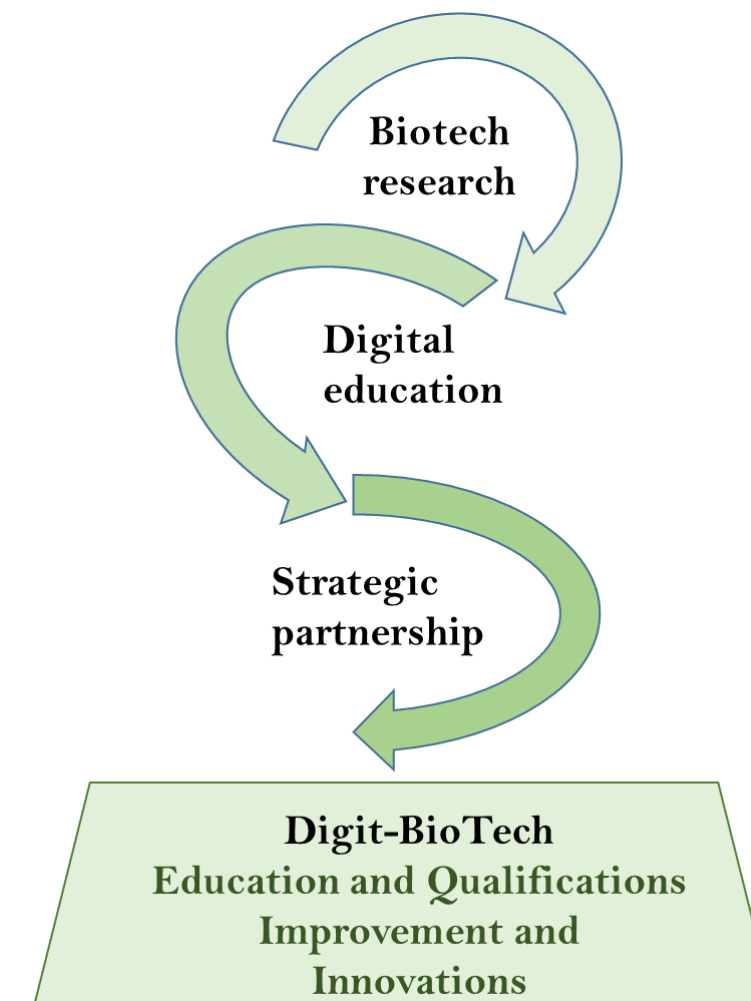
-  Building a bridge between digital technology and biotechnology by integrating environmental and innovation training.
-  Developing an innovative training programme in the field of biotechnology and ICT.
-  Exercising novel ways of learning and training.
-  Encouraging collaborative work between three universities, two SMEs, and one R&D Centers from four European countries: Bulgaria, Greece, Italy, and Germany – a consortium whose members understand the need to shift the educational policy from “knowledge” to “competence”.
-  Stimulating broad intersectoral, interinstitutional and intermodal activities.

The Digit-BioTech addresses the challenges by:

- Answering the needs for development of excellence and specific digital skills in higher education.
- Introducing innovative content and structure into the higher education institutions.
- Improving the education and competence of the target groups, esp. the skills of those that need to work with digital tools.
- Introducing bioinnovations for sustainable development into the biotechnology sector.

### Digit-BioTech contributes to the ERASMUS+ goal by offering:


- Opportunities for representative of the target groups to study, train, and gain experience.
- Work-based practical education and training to youth.
- A strategy in the development of digital education and the use of ICTs.
- Products available in five languages to support targets' language competence.
- Recognition of skills, including those learned outside the formal education system.
- A support for forming strategic partnerships among educational institutions and business organizations to foster quality improvements and innovation.
- Encouragement for Knowledge Alliances and Sector Skills Alliances, to address skills gaps and foster entrepreneurship by improving curricula and qualifications through cooperation between the worlds of work and education.
- An initiative to foster innovation in pedagogy, and progressive policy reform at national level.
- Access to teaching and research to support the integration between higher education systems of four EU countries.






The Digit-BioTech initiative produces:

I) A comprehensive digital educational platform hosting **Intellectual Outputs**, designed as learning outcomes:

 **Digit-BioTech Open Content Platform**, an innovative tool using blended learning approach for a self-paced free online education in the field of ICT for green biotechnology.

 **Learning Area & Reference Model (LARM)** for development of a training programme using a new methodology which employs Learning Outcomes (LOs) and Blended Learning Pathways (BLPs).

 **The Guide “Teaching and Learning in Higher Education”** targeted at the educational professionals and offering both the essentials of effective higher education teaching and guidelines of how to use the web platform.

 **A Students Smart Kit for BSc/MSc students** which describes the strategies for effective learning.

II) Strategic measures for project management and administration.

III) Seven multiplier events (workshops) and activities for popularization of the Digit-BioTech training programme and deliverables.

IV) Five transnational project meetings.

These products make the Digit-BioTech consortium a leader in innovations through:

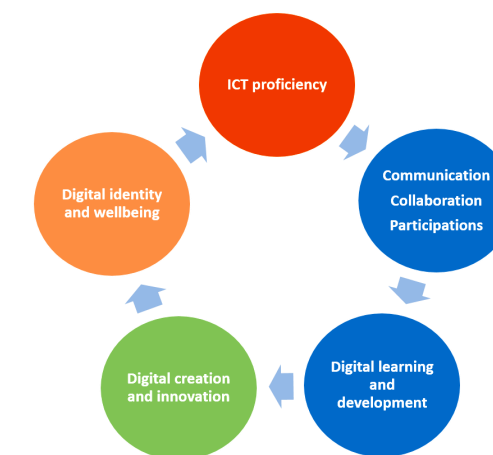
- Defining the applications of digital technologies in biotechnology.
- Creating a virtual space and educational content, enriched with visual elements and simulations.
- Applying the requirements of the European Qualification Framework and National Qualification Frameworks and the principles of higher education to provide the needed technical competence and skills to the target groups.
- Supporting the innovative potential of digital technologies and their effect on the green industry.

The Digit-BioTech steps on a number of stones such as:

- A review of the best examples of applications of digital technologies in education to create a guide focused on the best pedagogical and ICT-based practices in higher education.
- Involvement of the students in the learning process as learners, collaborators and team members to increase their capabilities to learn more easily and effectively.
- Equipment of the students with the necessary knowledge and skills while allowing them to master the learning process on their own.
- Targeting academic professionals and university graduates who need expert education and working competencies in ICT and digital technologies.

**Deliverables after the end of the Digit-BioTech:**

- Parts of the Digit-BioTech Open Content Platform will be accessible free-of-charge:
  - ◇ From the knowledge resources:
    - Four Intellectual Outputs.
    - Project management and administration measures.
    - Information and materials from the six workshops.
  - ◇ From the training part:
    - The innovative tool using blended learning approach for a self-paced online education in the field of ICT for green biotechnology, organized in modules designed and tailored for the target audience – in English, Bulgarian, Greek, German, and Italian.
- The Blended Learning Pathways (BLPs) will be accessible after free registration.
  - ◇ All Digit-BioTech results are free of charge, except the Blended Learning methodology – a strategy for organization of units of learning outcomes in Blended Learning Pathways (BLPs), offered as personalized training paths through ICT-based training mode.
  - ◇ The structure of the BLPs is subordinated to the requirements of the **European and National Qualification Frameworks and the principles of higher education and the ECTS validation instruments** for qualification development by ensuring technical competence and skills of the target users.



**The sustainability of the Digit-BioTech is due to:**

- The innovative training materials and practical teaching and guidance tools, with a focus on the knowledge content of the training modules – learner-centered and subject specific.
- The learning outcomes-based educational approach offered in a blended mode of presentation and tailored to fit individual needs of competence gaining.
- The mix of a virtual space and educational content: the facilities are user-friendly, and provide access to education for all at any place and at any time.
- The innovations which predict the high social and economic impact by contributing to the progress in the organization of the national higher education systems.

The Digit-BioTech delivers long-term impact by:

- Implementation of the Digit-BioTech outputs into the national educational systems at educational institutions and in-company training departments.
- Supporting the capacity of the higher education institutions to build up employability.
- Mobilizing science and technology and foster capacity for innovation.
- Improving the social, economic, and environmental sustainability.

## DIGIT-BIOTECH AND HIGHER EDUCATION

*“The only person who is educated is the one who has learned how to learn ...and change.”*

*Carl Rogers*

Digit-BioTech is the key for:

- Introducing innovative knowledge and skills acquired within the educational system.
- Achieving progress in the human resources development.
- Boosting the chances for employability and economic improvement in all partner countries some of which struggle with high youth unemployment.



Digit-BioTech provides:

- Training content in the form of units of learning outcomes, each with specific descriptors: knowledge – skills – responsibility – autonomy, and structured in personalized blended learning pathways designed for tangible Digit-BioTech target groups.
- Application of requirements of the European and National Qualification Frameworks and the principles of the higher educational systems for broader and smoother recognition of the acquired competencies.
- Grading of the learning outcomes with ECTS points and complying with the standards of the European Framework for Quality Assurance (EQAR) established by the European Association for Quality Assurance in Higher Education (ENQA).
- Focus on ICT, new technologies, and digital competencies.
- New innovative curricula, educational methods, and training courses.

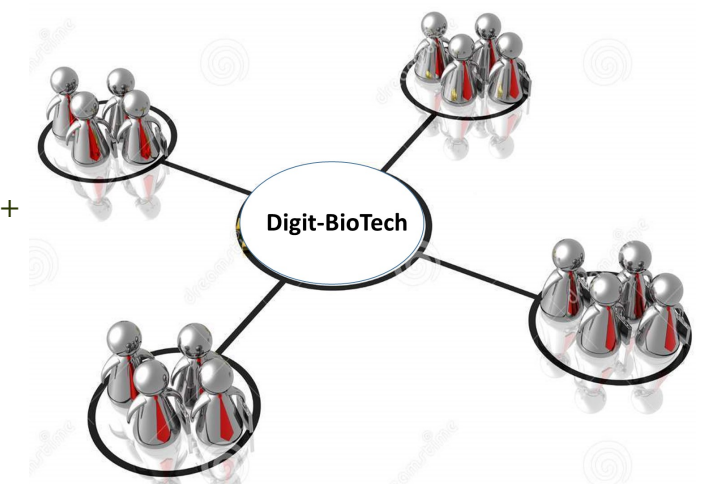
The measures outside Digit-BioTech partnership encompass:

- Dissemination at the Erasmus+ Project Results Platform.
- Use of the Digit-BioTech and organization websites for gathering automatic feedback on the content and knowledge updates.
- Organization of meetings and visits to key stakeholders to disseminate materials among interested groups.
- Performance of events for open discussion, e.g. information sessions, workshops, (online) seminars, training courses, exhibitions, trade shows, demonstrations, or peer reviews.
- Distribution of targeted written materials such as reports, articles in the press, newsletters, press releases, leaflets, flyers, brochures.
- Exploitation of different channels for media coverage (radio, TV, YouTube, video clips, podcasts or apps).
- Use of social media for popularization of the Digit-BioTech deliverables.
- Participation in public events – cluster activities for wider national, European and global recognition.
- Use of the Digit-BioTech branding and logo.
- Use of the existing contacts and networks – engaging professionals’, employers’, youth and training organizations with demos of the Digit-BioTech results to keep them informed.

## BEYOND THE DIGIT-BIOTECH PARTNERSHIP

Successful dissemination and use of results may lead to external recognition of the work done within the Digit-BioTech and guarantee its sustainability in order to:

- Raise awareness and highlights the European added value of activities supported by Erasmus+.
- Extend the impact by spreading information about the Digit-BioTech project to wider public, thus offering prospects for further exploitation of the Digit-BioTech results or a possible transfer of the training materials.
- Engage stakeholders and the target groups.
- Share the key lessons, solutions and know-how.
- Influence policy and practice to contribute to positive public perception.
- Encourage wider participation in the ERASMUS+ programme.
- Develop new partnerships.



The Digit-BioTech training programme is:

- Personalized and learner-centered.
- Providing transparent and broadly recognized knowledge, skills and qualifications.
- Oriented towards intracountry and transborder mobility.

The Digit-BioTech learners:

- Are independent planners and problem solvers.
- Prefer self-paced and self-learning environments.
- Can take the initiative.
- May be motivated to take the step to collaborative work.
- Are interested in experimental and practical training.
- Prefer to have a choice of learning styles, modes and flexibility.
- Strive to acquire transferable skills.

## WE: THE DIGIT-BIOTECH PARTNERSHIP

*"Coming together is a beginning, staying together is progress, and working together is success."*

*Henry Ford*



The applicant and coordinator of the Digit-BioTech project – **Sofia University "St. Kliment Ohridski"** – is the first university in Bulgaria and a leading national center in the higher education and research in fundamental and applied science, social sciences and the humanities. It is the largest university in Bulgaria with 102 degree programmes offered by 16 faculties. Lecturers and researchers conduct research in almost all fields of natural and social sciences, with one of the leading directions being biotechnology, agriculture and environmental technologies. Sofia University offers degree courses in almost all major domains of modern biotechnology: industrial biotechnology, agricultural biotechnology, food and medical biotechnology. Currently, research teams from the Sofia University are leaders and participants in over 30 international and national research projects funded by the EU programmes, National Science Fund and private partnerships. The researchers are recognized experts in biotechnology and environmental sciences and participate in the implementation of projects and measures within various programmes such as Horizon 2020, ERASMUS+, "Environment", "Natura 2000", etc.

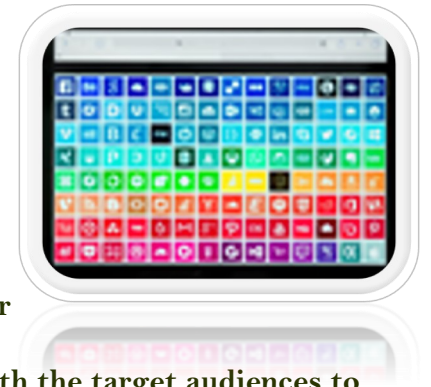


R&D Center "Biotech" is established with the mission to unify the efforts of highly qualified professionals in tuition, research, development and popularization activities in the field of biotechnology, environment protection, healthcare.

## DIGIT-BIOTECH DISSEMINATION

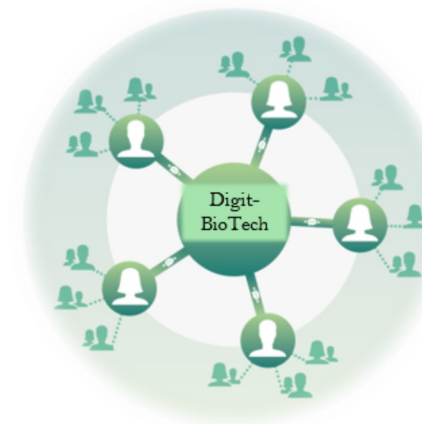
Dissemination is the tool to show the work that has been done through:

- Sharing the results, the lessons and the outcomes and findings achieved beyond the Digit-BioTech partnership to enable a wider community to benefit from the work done.
- Defining to whom the results to be communicated, both during and after the funding period.
- Involving the target groups from the get go to foster communication with the target audiences to maximize the use of the Digit-BioTech results.
- Outlining the dissemination measures, the channels and the appropriate agenda for spreading the Digit BioTech achievements inside and outside the Digit-BioTech partnership.



The Digit-BioTech targets for dissemination covers:

- At local and regional level – stakeholders, experts, practitioners in higher education and other interested parties (higher education professionals, educational community, local education authorities, teaching associations, teaching reviewers);
- At national and European level – decision-makers in higher education and employment sector who support the process of the implementation of results; employers and social partners from relevant economic sectors (online professional groups, national events creators, etc.); external experts involved in the assessment process; press and media; the general public.




The activities for the Digit-BioTech targets are focused on:

- Implementation of the activities on a local scale: establishment of national units for internal dissemination
- Set up of the Digit-BioTech Open Content Platform and its regular update.
- Assembly of the Digit-BioTech knowledge database: knowledge part of the Digit-BioTech LARM and the supporting resources: the Guide "Teaching and learning in Higher Education" and the Students Smart Kit.
- Shaping the knowledge content with the aid of external experts (associated partners), and framing the conditions for implementation of the EU validation instruments for education initiatives – European and National Qualification Frameworks, and ECTS.



It promotes the collaboration of different training settings dealing with higher and continuous education through the use of ICT in Europe. It has working relationship with employers to support the career prospects of trainees and has set up an effective feedback system. Staff members of R&D Center “Biotech” have experience in writing textbooks and other training materials, preparation of quality assurance guides and documentation, curriculum development, implementation of new IT-based training techniques, introduction of the instruments of the European and National Qualification Frameworks. The Center has expertise in the production, application and economic planning in the area of industrial and green biotechnology and sustainable environment, as well as in the design and implementation of microbial fermentation processes for production of biologically active compounds. R&D Center “Biotech” works closely with biotechnology companies, environmental scientists, hazardous waste technicians, engineers, and other professionals to address various environmental problems.

**SMART Project and Consulting Ltd** is a consulting company which provides strategic solutions to its customers who wish to successfully manage and grow their business in accordance with the international quality standards. It offers a full range of services aimed at helping all types of organizations, with the aim of enhancing competitiveness and sustainable growth. Its activities are mainly devoted to the biotechnology industry and other related economic sectors in the establishment and implementation of good managing practices (ISO 14001, ISO 9001, ISO 22000, FS 22000, IFS, BRC and ISO/IEC 27001, etc.) SMART Project and Consulting Ltd. main activities are focused on offering multidisciplinary services aimed at developing policy, assessing impact, creative design and implementation, gaining regulatory approvals, managing risk and others. Company delivers corporate and project environmental programmes, development strategies, effective operational management practices and reports on performance. Through groundwork and project management of EU funds and programmes, SMART Project and Consulting Ltd. has expertise in feasibility assessment of various operational programmes, development of overall project documentation and project management. The company offers also seminars and trainings on the international standards and current social issues by highly experienced speakers in the respective fields who successfully combine theoretical knowledge and practical skills.

 **UNIVERSITY OF WEST ATTICA** **University of West Attica (UNIWA)** was founded in March 2018 by the National Law 4521. The foundation of the newly established University resulted from the merging process of the former Technological Educational Institute of Athens and the Piraeus University of Applied Sciences. At UNIWA, there are twenty-seven Departments operating under the academic umbrella of five Schools, covering a wide range of scientific fields, such as social, administrative and economic sciences, engineering sciences, health and welfare sciences, as well as food sciences and applied art and culture studies. One of this departments is the National School of Public Health which was founded in Greece in 1929 with the aim to provide training, post-graduate training and specialized training for health professionals, as well as to study scientific and technical issues of public health. NSPH carries out research in all fields of public health and preventive medicine, conducts public health and laboratory research and tests.

## ... AND BEYOND

At local and regional level, the Digit-BioTech:

- Promotes networking among the higher education and other training providers on a local and regional basis.
- Increases the awareness about the application of digital technologies in biotechnology.
- Motivates the local and regional stakeholders to seek financial support for educational purposes.
- Offers e-based educational and technological knowledge to organizations outside the Digit-BioTech partnership.
- Uses its Open Content Platform to raise the users’ interest in e-training, to promote sustainability of its results, and to contribute to the local and regional economy.
- Enlarges the training based on requirements of the European and National Qualification Frameworks and principles of the higher education system and facilitates the integration of the Digit-BioTech learning outcomes approach in the local and regional training bodies.
- Introduces good practices in using innovative study programs and building the corresponding professional knowledge, skills, and responsibility.

At national and European level, the Digit-BioTech:

- Initiates different initiatives (multiplier events, seminars, face-to-face meetings, promotional media, etc.) to offer its positive practice in the area on the subject specific biotechnology and digital technology.
- Produces Intellectual Outputs which embed the requirements of the European and National Qualification Frameworks to support the national higher education systems.
- Supports the high training capacity of the Digit-BioTech partnership and its potential to transfer subject-specific information to related organizations.
- Strengthens the links between the training settings for formal and those for non-formal and informal education using the European Qualification Framework descriptors as a common tool for assessment and validation of knowledge and its consequent transformation in economy prospects.

At international level, the Digit-BioTech:

- Applies validation and recognition instruments that bridge the formal and the non-formal and informal learning to enhance the current trans-European process for smooth transition from education to work and the progression to further education.
- Provides opportunities to the target groups for advancement in their professional career and competence development at international level.
- Transforms its strategy in an internationally acknowledged algorithm for qualification development by ensuring technical competence and skills of the target groups.
- Successfully combines the knowledge, the practice, and the innovative tendencies in the EU higher education policy.

The National School of Public Health serves the Ministry of Health, Welfare and Social Services and other sections of the civil services sector in Greece with its expertise on matters within its competence. The National School of Public Health offers courses in various topics concerning public health within programmes in: public and environmental health; public and environmental health management; occupational health; health and environmental engineering. The School's staff has vast teaching and administrative experience to contribute to the development and implementation of competence-based collaborative blended learning model, transfer and elaboration of the products and outcomes, and valorization methods and techniques.



**SOKO**  
Sozialforschung  
Kommunikation

SOKO-Institut für Sozialforschung und Kommunikation is an owner-managed company based in Bielefeld. The SOKO Institute is a medium-sized social research institute mostly dealing with primary empirical research on behalf of government departments, universities and other institutions. It performs quantitative and qualitative studies and evaluates the collected data. The SOKO Institute's research priorities are in the labor market and social policy, educational policy and the renewable energy sector. The Institute is also highly engaged in ethical and environmental and health research with a special focus on sustainable development and corporate social responsibility. The SOKO Institute cooperates closely with CELLS (Centre for Ethics and Law in the Life Sciences) at the Leibniz University of Hannover (LUH) and with the IALS (International Academy of Life Sciences) at the Hannover Medical School (MHH). The high quality of the conducted research and the experience of its researchers make the SOKO Institute a preferred partner in various European projects.



Alma Mater Studiorum – Università di Bologna was founded in 1088 and is an internationally recognized university center for science and the arts. In its five campuses in the Emilia Romagna region and in the branch in Buenos Aires, the University of Bologna offers over 200 degree programmes among its 32 Departments to over 81,000 students. 5,000 graduates are enrolled in PhD and other post-graduate programmes. Researchers participating in the Digit-BioTech project, work at the Department of Agricultural and Food Sciences (DISTAL). Founded in 2012, DISTAL hires 145 teaching staff members and 100 administrators and technicians. Research at DISTAL spans across several topics including primary and food production, sustainable plant defense and environmental protection. DISTAL has a large and advanced expertise in environmental protection and in the definition of sustainable strategies for its preservation and clean-up. The role of DISTAL is to integrate biotechnological approaches with mitigation approaches based on natural strategies, keeping the focus on sustainability.

## DIGIT-BIOTECH: INTELLECTUAL OUTPUTS

### 1. Digit-BioTech Open Content Platform

**Coordinator:** Sofia University St. Kliment Ohridski

**Content:** Open / online / digital education – Massive Open On-line Course (MOOC)

**Media:** website

**In:** English, Bulgarian, German, Greek, Italian



To present three of the Digit-BioTech intellectual outputs.

To discuss different biotechnology and digital strategies that support the green economy and entrepreneurship and how the Digit-BioTech outcomes can improve end-users' competencies and career prospects.

To identify the ways to strengthen the green economy through better training within the Digit-BioTech framework.

To form a network of end-users of LARM: educational professionals, students, representatives of research organizations and SMEs working in the field of biotechnology and sustainable development.

To disseminate and popularize the Digit-BioTech achievements.

## DIGIT-BIOTECH IMPACT ON THE TARGETS

*"If a movement is to have an impact, it must belong to those who join it, not those who lead it".*

*Simon Sinek*

The Digit-BioTech target groups benefit from:

- Their involvement at each step of the Digit-BioTech implementation: from strategy shaping and objectives identification to participation in the planning and realization of the activities, evaluation of the results, and implementation of the lessons.
- The support to the process of teaching/tuition, since it encourages teachers/trainers and other learning facilitators to upgrade and update their knowledge and skills, to create training content, and transfer it to their trainees.

The Digit-BioTech partner institutions benefit from:

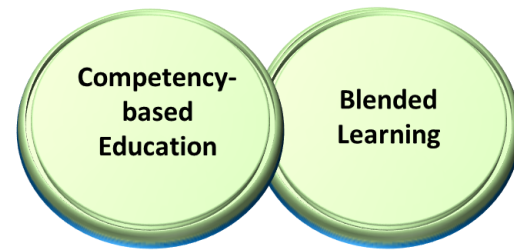
- The introduction of novel approaches to building up transparent qualifications based on the principles of the European Qualification Framework and its descriptors with respect to the Digit-BioTech Learning Outcomes.
- The support to the transition from tutor-led training to a learner-centred one to contribute to the implementation of the European educational strategy at national level and the maintenance of the high quality of education standards.

The Digit-BioTech participating teams and supporting organizations benefit from:

- The enriched personal contacts, encouraged teamwork, and the Digit-BioTech network.
- The complementarity of expertise, scope of activity and experience which is a basic principle in the formation of the Digit-BioTech partnership.
- The focus on good practices of shared objectives and achievements to create profit for the society.
- The evaluation of the Digit-BioTech Intellectual Outputs and the multiplication of their effect.
- The assessment of the process of gaining new competences through online and offline approbation of the Digit-BioTech programme and the accumulated feedback.



*The Digit-BioTech Open Content Platform* is an innovative tool which uses web 2b interface and 3D imaging technology to offer free self-paced online education in the field of biotechnology and ICT. The website encourages the upgrade of skills and competencies among academic professionals and students.



The platform is an open learning tool which acts as flexible e-medium to provide learning opportunities for competence-based blended learning, knowledge database and experience exchange platform comprising the following solutions:

- 1. Digit-BioTech knowledge part** presents the key ideas, aims, ambitions and approaches of the Digit-BioTech method along with a brief introduction to the offered learning opportunities and Intellectual Outputs, the Digit-BioTech partnership, expertise and competence.
- 2. Digit-BioTech Concept, Learning Area & Reference Model**, comprises a specific part of the platform dedicated to the blended learning opportunities for the Digit-BioTech target groups: academics, researchers and students. This part offers all learning outcomes organized in personalized blended learning pathways (BLPs), plus user guides for better comprehension and acquisition of the training content, along with 3D educational images.
- 3. Digit-BioTech dissemination and use part:** the website is a promotional instrument hosting all dissemination tools and materials to ensure the overall Digit-BioTech transferability and its sustainable impact during the project and post-project life.

The *Digit-BioTech Open Content Platform* provides learning opportunities beyond the classroom by applying new technologies with a focus on subjects with high impact on learning experience. The innovative web interface combines a **content management system** with **constituent relationship management (CRM)** technologies which allows universities to manage students' needs and to work to improve students' digital skills and their future career paths.

The free access to the Digit-BioTech website enhances the transferability and wider implementation of the Digit-BioTech training resources. The Digit-BioTech website is:

- Usable and easy to navigate.
- Compatible and scalable.
- Well designed, informative, consistent and result-oriented.
- Organized in a logical way and user friendly.
- Visible in all search engine, optimized for organic search traffic.
- Visually appealing, unobtrusive and functional.

## 2. Digit-BioTech Learning Area & Reference Model (LARM)

*Coordinator:* R&D Center Biointech

*Content:* Course / Curriculum – Design and development

*Media:* website

*In:* English, Bulgarian, German, Greek, Italian



### Objectives:

To contribute to the integration of the new Digit-BioTech knowledge and skills into different public and business areas.

To introduce the role of ICT and its impact on the biotechnology by highlighting their role for the development of green society.

To discuss the demands for training in the Digit-BioTech area and three intellectual outputs.

To submit the Digit-BioTech Blended Learning Pathways to academic professionals and BSc/MSc students for evaluation and popularization.

To make approbation of the Digit-BioTech Students Smart Kit at national level.

To draw attention to the latest economic and social trends with a focus on the innovative outputs as part of a strategy for improving the quality of life.

To disseminate the achievements of the Digit-BioTech for better recognition at national and international level.

To form canvassing partnerships and networks to support the Digit-BioTech training in Germany and abroad.

**WORKSHOP:** Bringing into focus smart Biotechnology combined with ICT for green economy



**When:** October / November, 2021

**Where:** Bologna, Italy

**Organizer:** the University of Bologna

**Target groups:** representatives of universities, academies, R&D Centers, policy decision makers, relative stakeholders.

**Targeted outputs:**

Digit-BioTech Learning Area & Reference Model (LARM)  
Guide "Teaching and learning in Higher Education"

### Objectives:

To increase the knowledge of participants on the strengths and limitations of the EU approaches for making university course more relevant to the labor market.

To introduce the knowledge, practical skills, techniques, and ideas which the targets can acquire from the Digit-BioTech.

To outline the role of ICT and biotechnologies for sustainable life and the necessity for adequate training in the field.

*The Digit-BioTech Learning Area & Reference Model (LARM)* is focused on the organization and delivery of an innovative educational programme based on ICT and biotechnology and a strategic system for organization of the educational process in line with the requirements of the European and National Qualification Frameworks and the higher education requirements. Its content was specified during the feasibility stage of the Digit-BioTech on the basis of analysis of the needs of existing university programmes in respect to the requirements of the target groups.

The **Digit-BioTech Educational Curriculum** comprises the following topics:

*Module I. Green technology challenges from Biotechnology and ICT for life with the following learning outcomes:*

Systems Biology and Omics Technologies

The Application of 3D Printing and ICT for Green Products and Processes

Biosensors & Biochips for Sustainable Future

Green ICT & Energy: From Smart to Wise Strategies

Scientific Resources with Open Access: Digital databases



*Module II. Awareness and Acceptance of Biotechnology Issues with the following learning outcomes:*

Social and Political Acceptability of Modern Biotechnology Tools

Environmental Benefit from Modern Biotechnology and ICT application

Bioethics and Modern Biotechnology



**WORKSHOP:** Novel insights and innovations in Biotechnology & ICT towards improved quality of life

**When:** March / April, 2021

**Where:** Athens, Greece

**Organizer:** University of West Attica (UNIWA)

**Target groups:** higher education providers and professionals working in the biotechnology and ICT sectors, governmental and non-governmental organizations, companies, non-formal training establishments, expert institutes.



**Targeted outputs:**

Digit-BioTech Open Content Platform

Students Smart Kit

Guide “Teaching and learning in Higher Education”

**Objectives:**

To share information about using the Digit-BioTech training programme and Learning Outcomes with the target groups.

To introduce three intellectual outputs with a focus on the accessibility of the training courses and blended learning structure and their functionality.

To present different biotechnology and ICT innovations and their future implementation in social life as environmental oriented benefits.

To identify available expertise from all related institutions.

To organize higher education network in ICT for biotechnological industry.

To identify knowledge gaps and research needs.

To introduce the Digit-BioTech role in manpower training and technology development.

To define the links between national and European strategies for a greater access to learning or employment opportunities in the biotechnology sector.

To increase the awareness of the target groups for the significance of new development strategies and tools for qualification upgrade.

**WORKSHOP:** Boosting economic and social development through Biotechnology & ICT

**When:** June / July, 2021

**Where:** Germany

**Organiser:** SOKO-Institut für Sozialforschung und Kommunikation

**Target groups:** professionals linked to different biotechnology and IT sectors, research centers and institutes, universities and academies.



**Targeted outputs:**

Digit-BioTech Open Content Platform

Digit-BioTech Learning Area & Reference Model (LARM)

Students Smart Kit

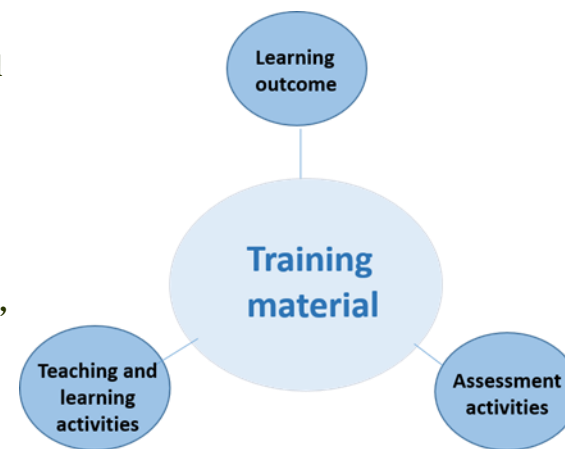


The development of Digit-BioTech LARM includes:

- Introduction of digital competencies: information and data literacy; communication and collaboration; digital content and creation; safety and well-being; and problem-solving.
- Definition of learning outcomes covering knowledge, skills, responsibility and autonomy that can be also achieved after the completion of the learning content.
- Formulation of Blended Learning Pathways (BLPs) foreseen for both academic professionals and BSc/MSc students and 6, 7 and 8 levels of the European and National Qualification Frameworks and the higher education system.
- Granting of ECTS points for the Blended Learning Pathways and qualification in a numerical form to indicate the relative weight of a unit in relation to the traditional full qualification.
- Translation of all training materials in four languages: English, Bulgarian, Greek and Italian.

For the successful delivery of Digit-BioTech Education Programme, we will apply:

- Assessment of the learners at the entrance level.
- Description of the tasks and roles of the higher education professionals and decision makers.
- Methodology for organization of knowledge.
- Planning teaching and learning: curriculum design and development
- Determining the course structure and design of the Blended Learning Pathways (BLPs): definition of descriptors for the learning outcomes.
- Implementing methods for organization of online and offline blended learning approaches (audio, video, text, demonstration, interfaces, 3D imaging, etc).
- Use of consistent techniques for supporting and assessing the learning process.
- Provision of feedback: use of general criteria for evaluation.



### 3. Guide “Teaching and Learning in Higher Education”

**Coordinator:** University of West Attika (UNIWA)

**Content:** Methodologies / guidelines – Methodological framework for implementation

**Media:** website

**In:** English, Bulgarian, German, Greek, Italian

The Guide “Teaching and Learning in Higher Education” is aimed at academic professionals and is included in the Blended Learning Pathways. Special emphasis is put on e-learning and ways of providing evidence for accredited teaching certificates and promotion, including the expanding use of teaching portfolios. Professionals from different disciplines could benefit from the reflections on challenges in teaching, learning and assessing.

The Guide is divided into two parts and offers both the essentials of effective higher education teaching and guidelines of how to use the Digit-BioTech web platform.

To present the benefits and appropriate implementation of two Digit-BioTech intellectual outputs.

To discuss the innovative strategy for blended learning and its role for improving the green solutions.

To emphasize the knowledge and skills provided by the Digit-BioTech and their impact on the green and sustainable knowledge-based economy.

To discuss the ways to enhance innovation in the higher education in biotechnology and the translation of latest scientific research into the educational curricula.

To highlight the critical aspects of ICT necessary for the higher education to impact the future development of the biotechnology sector.

To distribute information materials about the Digit-BioTech achievements and capacity.

### WORKSHOP: Biotechnology & ICT innovations for sustainable goods and services

**When:** May / June, 2021

**Where:** Sofia, Bulgaria

**Organizer:** R&D “Biointech”

**Target groups:** specialists in the field of sustainable biotechnology: representatives of higher education institutions, research centers and SMEs from biotechnology and IT areas, appropriate stakeholders.

### Targeted outputs:

Digit-BioTech Learning Area & Reference Model (LARM)  
Guide “Teaching and Learning in Higher Education”



### Objectives:

To present the role of ICT as innovative tools for sustainable economic development.

To discuss different opportunities for SMEs, research organizations and interested individuals to integrate the Digit-BioTech resources in biotechnological processes and product development.

To emphasize the new aspects of digital technologies as providers of services for biology and biotechnology research.

To discuss two Digit-BioTech intellectual outputs and their benefits.

To evaluate the presented deliverables by collecting feedback in order to identify the gaps and make amendments.

To discuss the format and content of materials in respect to the national requirements for the higher education.

To distribute information flyers and brochures about the Digit-BioTech achievements and capacity.



*The first part of the Guide covers core topics on:*

- Understanding how the students learn (lecturing in large groups, teaching and learning in small groups, teaching and learning for employability, e-learning, etc.)
- Curriculum design and development for higher education teaching and learning
- Assessment of students' learning
- Evaluating courses: teaching quality, standards and enhancement

*The second part of the Guide provides:*

- Specific case studies
- Real-life examples
- Links to the Digit-BioTech website
- A step-by-step description of how professionals in higher education can benefit from the blended learning opportunities in the Digit-BioTech web platform

The Guide summarizes the most effective modern methodologies for good teaching, while paying a profound attention on the necessity for implication of digital technologies in the higher education system. Its transferability potential is due to: the measurable positive impact on teaching quality and competence; the qualitative methodological approach for teaching, based on grounded theory approaches; the discussion on the key issues surrounding the modernization of higher education; the ways to utilize ICT in educational contexts.

#### 4. Students Smart Kit

*Coordinator:* Alma Mater Studiorum – University of Bologna

*Content:* Methodologies / guidelines – Methodological framework for implementation

*Media:* website

*In:* English, Bulgarian, German, Greek, Italian



Studying is a skill. Being successful in university requires a high level of this skill. Students must first learn and practice it to develop effective studying habits. A *Students Smart Kit* is a specific guide for BSc/MSc students which is also part of the Blended Learning Pathways for university graduates.

The *Kit* describes methods for effective study, covers a discussion on advantages of higher education and advises students' how to benefit from the Digit-BioTech blended learning platform in the way toward their preferred career and workplace.

Special attention is paid to time management, self-discipline, concentration, memorization, organization, and effort. Students could learn what their preferred learning style is, how to organize their studies, and ways to memorize the knowledge – skills to be easily integrated into other areas in life esp. in their career or any activity requiring thought, planning, information processing, and self-discipline.

The *Students Smart Kit* describes how students can use the *Digit-BioTech Learning Area & Reference Model (LARM)* to achieve their learning goals, with case-study based instructions for how to reach and retrieve maximal benefit from it. The process of assessment and certification of learning achievements and criteria for success are also part of the *Kit*. The high transferability potential of the *Kit* draws upon the opportunities to students to:

- adopt skills needed to effectively learn and further apply them at their workplace;
- acquire personalized learning pathways best fitting to the circumstances, location and interests;
- see the potential transfer implications of what they are learning.

## DIGIT-BIOTECH: MULTIPLIER EVENTS

**WORKSHOP:** Biotechnology & ICT: what they are and how they are about to change our lives

**When:** June / July, 2020

**Where:** Sofia, Bulgaria

**Organizer:** Sofia University “St. Kliment Ohridski”

**Target groups:** representatives of universities, public-private partnerships, R&D centers, policy decision makers, academics and other training institutions.

**Targeted outputs:**

Digit-BioTech Open Content Platform

Guide “Teaching and Learning in Higher Education”

**Objectives:**

To introduce the environmental competitive advantages related to biotechnology and ICT fields, the innovative strategies for reducing the negative impact on the environment and health by applying digital approaches to the higher educational sector.

To present three of the Digit-BioTech intellectual outputs.

To discuss the impact of digital technologies and blended learning approach on free e-based platform for online education (all participants receive ongoing access to the Digit-BioTech Open Content Platform).

To receive feedback to be used for improving the Digit-BioTech intellectual outputs and for the future implementation of LARM.

**WORKSHOP:** Innovative ICT based solutions in bioeconomy sectors

**When:** October, 2020 – September, 2021

**Where:** Sofia, Bulgaria

**Organizer:** SMART Project and Consulting

**Target groups:** representatives of biotechnology SMEs and other companies, IT specialists, research centers and policy decision makers.

**Targeted outputs:**

Digit-BioTech Learning Area & Reference Model (LARM)

Digit-BioTech Open Content Platform

**Objectives:**

To foster research, knowledge transfer and training innovations in the biotechnology sector through applying modern digital technologies to improve productivity, sustainability and competitiveness.

To provide participants with opportunities to use ICTs as a source of free online education in green biotechnology.

