



H2020 Work Programme

D3.4 Plans for vocational, academic and life-long-learning programmes for the existing workforce by the six BBEC

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This document is the BIOBEC project (contract no. 101023381) corresponding to D3.4 (M22) led by University of Bologna. This report provides a report on the plans for vocational, academic and life-long-learning programmes drafted by the six BBEC.

This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023381. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.



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07/06/2023	0.1	First draft		
16/06/2023	1	Draft for internal discussion		Changed structure and more content compared to the previous version
06/07/2023	2	Preliminary final version		Modified accordingly to reviewers' comments
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1.Acronyms and abbreviations

BBEC	Bio-Based Education Centre
DOA	Description of action
EC	European Commission
T	Task
VET	Vocational Education and Training
WP	Work Package

1.1.Partners and abbreviations

<i>NAME</i>	<i>SHORT NAME</i>
ALMA MATER STUDIORUM – UNIVERSITA DI BOLOGNA	UNIBO
UNIVERSITAET HOHENHEIM	UHOH
ITA-SUOMEN YLIOPISTO	UEF
IRISH BIOECONOMY FOUNDATION	IBF
MUNSTER TECHNOLOGICAL UNIVERSITY	MTU
FUNDACION CORPORACION TECNOLOGICA DE ANDALUCIA	CTA
CONSIGLIO NAZIONALE DELLE RICERCHE	CNR
FBCD AS	FBCD
INSITUT NATIONAL DES SCIENCES ET INDUSTRIES DU VIVANT ET DE L'ENVIRONNEMENT - AGROPARISTECH	APT
UNIVERSITAT AUTÒNOMA DE BARCELONA	UAB
FUNDACJA EDUKACJI I DIALOGU SPOLECZNEGO PRO CIVIS	PRO-CIVIS
SUSTAINABLE INNOVATIONS EUROPE SL	SIE
STICHTING IHE DELFT INSTITUTE FOR WATER EDUCATION	IHE
WAGENINGEN UNIVERSITY	WU
FVA SAS DI LOUIS FERRINI & C.	FVA
UNIVERSITAET FUER BODENKULTUR WIEN	BOKU
INSTYTUT BADAN EDUKACYJNYCH	IBE
TRAKIYSKI UNIVERSITET	TRU
ZEMEDELSKY VYZKUM, SPOL SRO	ART

2.Executive summary

Following the assessment of regional needs and expectations made within WP1 and the preliminary definition of elements important for designing the Centres made in WP2, the BIObec project moved toward WP3, in which the main objective is to assess the feasibility and the sustainability of the six BBECs. To do so, three main dimensions have been identified, i.e. *governance structure, economic and financial requirements, and plans and programs for education and training.*

This document reports the activities carried out and the results obtained in the scope of Task 3.4, which had the aim of identifying the Centres' plans and programs for education and training, targeting in particular learning objectives, entrance requirements, skills, contents (topics), teaching methods, and learning instruments.

To achieve this objective, the Task was conducted through the submission of a template to each of the six BBECs. Once the document was filled out by BBECs' partners together with regional IRWGs, the Task coordinator ran an analysis of the received templates, comparing them, and focusing on similarities and differences.

In particular, two main dimensions have been taken into account: the general approach and scope of the BBEC (with specific information on Educational level, Main content, Entrance requirements, Language, Period of activity, and Further information); and specific information on activities (subdivided into three sections, corresponding to the three typologies of activities identified: Learning activities; Experiential and workplace learning activities; and Non-learning activities).

To summarize, the model of BBEC that emerges from Task 3.4 is a Centre that has a transversal vision of the European and national contexts (sources of inputs), and a deep country-based educational offer (sink of outputs), and this is the reason why each Centre is very different in the educational offer from the others, but, at the same time, has strong connections with them.

At the core of the design of the BBECs, there is a different interpretation of the concept of "knowledge hub", according to the cultural background, the local needs, and the expertise of each regional context.

The description of both the educational identity and the educational offer of the Centres is still far from being exhaustive, to some extent on purpose as long as it is clear that only during the implementation phase will further definition be able to take place in a robust manner.

However, looking at the objectives of the activities identified, it is possible to say that the learning programmes of all the Centres propose ambitious goals, aiming to strongly impact society (e.g. connection industry-research; connection unemployed people-world of the job; connection public administrations and industry; improvement of the bioeconomy value web; etc.).

To implement these ambitious objectives there are some necessary points, both internal and external to BBECs, to be addressed. Internal provided are:

- a. A good (suitable) governance structure that is suitable for the stakeholders' involvement and networking purposes;
- b. Access to an economic/financial expert to assess the sustainability of the BBEC business plan and assist with accessing funds;
- c. A continuous interface with the other BBECs and, possibly, with central coordination to maintain an international/European vision and to avoid waste of resources, opportunities and value.

External challenges to learning programs are represented by: new technologies, such as AI, machine learning, etc. that in a few years (or even less) may deeply change the whole educational system, requiring new expertise, competencies and knowledge; and by the concept of bioeconomy itself that may be subject to change in the next years because of its strong connection to innovation, a fundamental aspect of bioeconomy. Hence, it is key for the BBECs to have in mind alternative options in a larger set of potential activities, to envisage future-scanning activities to prepare for future changes, as well as developing contingency plans, in such a way as to be able to adapt to uncertain futures and exploit any opportunities that arise.

3. Introduction and objective

The design through the co-creation of operational models for the BBECs started within WP2 and offered the project several valuable outcomes. In particular, the Business Model Canvas (BMC), developed in the scope of T2.3 (see D2.2), briefly outlined the scope of the 6 BBECs. Although not exhaustive, these outlines provided some important insights into the project, including above all:

1. The dimensions explored in the BMC are the result of a co-creation process that put together BIObec partners and IRWG;
2. The six BMCs represent a starting nucleus for further analysis.

Indeed, together with the results coming from WP1 (i.e. regional needs and expectations analysis), the WP2 outcomes introduced the activities in the scope of WP3. More in detail, the third WP of BIObec has the aim of assessing the feasibility and the sustainability of the 6 BBECs. To do so, three main dimensions that gather all the items of BMC have been identified, i.e. *governance structure, economic and financial requirements, and plans and programs for education and training*, representing the main focus of three tasks of WP3, namely T3.2, T3.3, and T3.4. In addition, Task 3.5 will present the expanded Business Plans of the six BBECs and discuss the overall exploitation and sustainability plan. However, to avoid the risk of tasks being disconnected from each other, a coordination activity was conducted through T3.1, which had the aim of ensuring consistency among the different tasks of the WP. The activities carried out in this task aimed to interconnect the BBEC design with the specification of the scope, methods, and planning of the WP3 tasks. Among the others, T3.1 made clear that proceeding in parallel for T3.2, T3.3, and T3.4 is the only way to guarantee strong connections and flows of information among the Tasks themselves, obtaining consistent and valuable results.

The present deliverable collects all the inputs in the scope of T3.4, providing plans for vocational, and academic education as well as for lifelong learning programs for the existing workforce. In particular, it specifies learning objectives, entrance requirements, skills, contents (topics), teaching methods, and learning instruments.

Indeed, the objective of this deliverable is to offer an overview of the main activities the BBECs are intending to provide. This overview does not only represent a collection of different activities, but it is expected to show how the knowledge hubs developed in BIObec might be very different from each other in terms of scope, targets, and methodologies. In other words, – and this is one of the main objectives of the overall project – how the configuration of the

Centres may change case by case to fit with regional/national needs, expectations, and, in general, socio-economic conditions.



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4. Methodology

In order to collect from the 6 BBECs their plans and programs, a co-creation process was held within T3.4.

A draft template was developed in January 2023 by the UNIBO team. The rationale behind the template was to distinguish between the *general information* about the Centres and the *specific information* on the courses. Hence, the template was designed according to these two kinds of information. Once developed, the document – a Word file with mixed open-ended and closed-ended questions – was presented to the whole Consortium on Wednesday, January 25th, in Seville, at the project meeting. The general structure was accepted by the partners with the request for some minor changes such as the concept of “courses” was changed to the broader concept of “activities”, perceived as more suitable.

The comments received during the project meeting were integrated to finalize the template and make it ready to be used. The blank version of the template is reported in Annex 1.

To test the template, a pilot workshop was organized for the Mediterranean BBEC. As a first step, the document was pre-filled by the UNIBO team with the activities reported in the “Key activities table” in D3.1. It is important to underline that these activities had already been validated by the Mediterranean members of the IRWG. For this reason, the IRWG members were not involved in the pilot workshop, allowing the possibility for the Mediterranean partners (i.e. FVA, CTA, CNR, UAB, SIE) to discuss both the content and the form of the template. The pilot workshop was held on Tuesday, March 7th and all the indications were collected and added to the template. The fulfilled version of the Med-BBEC template was submitted to partners for written comments. Once received, they were discussed by email and accepted. However, the document was not defined as a final version but as a draft because it needed to be discussed with IRWG and compared with other WP3 outputs. Nevertheless, on the 10th of March, it was submitted, together with the blank version to all the Consortium, asking all the BBEC leaders to collect the inputs both from partners and IRWG members. About the latter, the Coordinator strongly recommended to involve the regional/national IRWG in the design-process, leaving it up to BBEC leaders to decide how to involve them.

The 5 documents from the remaining BBECs were uploaded during April and May 2023 on the Project’s SharePoint. The platform was preferred to email exchanges because, as aforementioned for Med-BBEC, this solution allows partners to edit the documents after delivery. Indeed, mid-June was set as the deadline to modify the activities or integrate new elements, but the presence of the documents on the platform allowed to UNIBO team to begin the cross-case analysis.

From the beginning of Task 3.4, the need of guaranteeing consistency with the other WP3 tasks pushed partners to meet periodically with online meetings. In these meetings, organized and coordinated by the WP3 leader, the progress on tasks, doubts, critical issues and ideas were discussed and the interconnections among tasks were explored. Within these meetings, the plans and programs for education and training, and, more in general, the activities the BBECs will promote were identified as starting points for any further discussion both for governance and for economic and financial requirements. More details can be found in D3.2, D3.3, and D 3.5.



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5. Results

All the 6 BBECs' fulfilled templates are available in Annex 2. This results section describes and collates information from these completed templates.

In particular, the general information on the BBEC subchapter is divided into:

- Educational level;
- Main content;
- Entrance requirements;
- Language;
- Period of activity;
- Further information.

Instead, the specific information is subdivided into three sections, corresponding to the three typologies of activities identified:

- Learning activities;
- Experiential and workplace learning activities;
- Non-learning activities.

Within these sections, several items will help to better understand and describe every activity, such as the general objective, the content, the skills provided, or the teaching methods.

5.1. General information on BBECs

The information collected in this section of the document aimed to frame the Centres on transversal and generic aspects. The main objective was to understand the different configurations that the six BBECs might take and how the concept of a knowledge hub may vary in changing conditions like different regions, different stakeholders, etc.

At the end of the section, Table 1 provides a summary of the general information BBEC by BBEC.

Educational level

Almost all the BBECs stated that they will target vocational education and training (VET), lifelong learning (LLL), academia and entrepreneurship training, except for the Mediterranean BBEC, which will not provide entrepreneurship training, at least at the beginning. Furthermore, the Danish BBEC added "job exchange" in the item "other."

Main content

This question asked which would be the main topics for the BBEC, offering a list of sectors that mainly compose the bioeconomy. The sectors and the BBECs answers are reported in table 1:

	<i>Med-BBEC</i>	<i>BBEC CE</i>	<i>Danish BBEC</i>	<i>Finnish BBEC</i>	<i>Irish BBEC</i>	<i>German BBEC</i>
Primary production systems – agriculture, forestry, aquaculture, including waste and side streams	X	X	X	X	X	X
Food, feed, fibres and bio-based industries	X	X	X	X	X	X
Fuels and bio-energy	X	X	X	X	X	X
Sea, oceans and waters	X	X		X	X	
Others		X	X			

The listed sectors were selected all by three BBECs, namely Med-BBEC, Finnish BBEC and Irish BBEC. The Central Eastern BBEC selected all the sectors listed but it also added the connection with “biorefining, nanomaterials, biotechnology and nanotechnology in the development of new biomedical materials (including biomaterials) and innovative drug forms; basic, preclinical and clinical research in the areas of medical biology and clinical medicine.” Instead, both Danish and German BBECs did not select “Sea, oceans and waters”, with the German one did not add other sectors, while the Danish BBEC indicated the “Livestock production in bioeconomy and the role of industrial symbiosis in bioeconomy” as an additional sector of interest for their activities.

Entrance Requirements

The educational activities proposed by the BBECs include varying entrance requirements depending on the academic content/level of the activity and the proposed outcome. These entrance requirements include:

- none;
- assessment of competencies/experience;
- academic pre-requisites;
- workforce of specific companies/entities (e.g. only for BBEC's partners).

Language

The main language of the activities represents a strategic point in the design process. Indeed, the decisions on this issue clearly identify the main geographical scope of the BBEC. For the two regional BBECs, i.e. Mediterranean and Central-Eastern, two different decisions were made. The former decided to prioritize the activities on a national scale, selecting Italian and Spanish as the main languages, while English was pointed out mainly for common materials or communication and dissemination purposes. The latter selected English as the priority language, with the national languages (i.e. Bulgarian, Czech, Polish) used only for some materials.

The scenario for the remaining four national BBECs is quite similar to each other. Except for the Irish BBEC which naturally selected English as the only language, the German and the Finnish BBECs did not prioritize a language between the national one and English, implying availability to national and international activities. Instead, the Danish BBEC answered that most of the activities will be in Danish but there is full availability to make international courses and collaboration with other BBECs, especially for higher levels of education.

Period of activity

All the BBECs selected the response “All year round”, planning to offer summer schools. This aspect witnesses the will to activate full-time Centres.

Further information

The MED-BBEC added that it intends to valorise existing teaching material first and then creating common teaching materials. Hence, it will not provide its own educational pathways or education and training courses in a formal way. Indeed, it is intended to play as enabler and broker between demand and offer of Education and Training in bioeconomy. In this view, it will be connected with all the education entities at any educational level (academic, VET, lifelong learning) and at any geographical level (local/regional, national, European, international) providing a wide web of opportunities to its customers.

Instead, the BBEC CE states that it will not provide internally made educational and training courses but it aims to become a hub for knowledge exchange, education, cooperation and providing services related to Bioeconomy. This approach enhances the participation and guarantees a substantial interaction between different disciplines in the region and with other BBECs. In order to achieve as many goals as possible, a flexible structure is necessary. The structure has to allow flexibility and openness in order to integrate and use the existing potential of a scientific network, business, education partners (members of IRWG and other). The BBEC CE will also include cooperation with other valuable on-going initiatives in EU and/or CEE macro-regional level.

The Danish BBEC aims to coordinate existing educational offers by vocational and academic institutions that support the BBEC itself. Probably 'missing' courses to the existing offers due to the cross-silo and cross-institutional nature of the Bioeconomy will be added. However, for the 'real' establishment of the Danish BBEC, it is planned a more detailed project description (in Danish) outside the formula provided for T3.4.

Similarly to the Mediterranean and the Danish BBECs, the Finnish BBEC states that educational activities are provided by the key actors involved in the BBEC and not directly through the BBEC. Therefore, the platform they are planning to establish is mainly intended to promote these educational activities as well as to connect actors to each other.

The Irish BBEC will provide an online knowledge database for all Irish bioeconomy stakeholders to contribute to by identifying their needs, expertise, resources, and areas of study. The Irish BBEC will coordinate and market the educational & training courses on offer at the various levels, acting as a coordination hub between existing educational institutions and their bioeconomy related offerings. Through interaction with industry stakeholders and national policy makers the Irish BBEC will identify any skills gaps and work with existing educational & training institutions to ensure that suitable activities are developed to serve these gaps in the market. These activities could include educational courses, apprenticeships, coaching, technical mentoring etc.

No further information were provided by the German BBEC.

Table 1. Summary of general information on BBECs

	Med-BBEC	BBEC CE	Danish BBEC	Finnish BBEC	Irish BBEC	German BBEC
Educational level	Vocational Education Academia Lifelong learning	Vocational Education Academia Lifelong learning Entrepreneurship training	Vocational Education Academia Lifelong learning Entrepreneurship training Job Exchange	Vocational Education Academia Lifelong learning Entrepreneurship training	Vocational Education Academia Lifelong learning Entrepreneurship training	Vocational Education Academia Lifelong learning Entrepreneurship training
Main content	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy Sea, oceans and waters	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy Sea, oceans and waters Biorefining, nanomaterials, Biotechnology and nanotechnology in the development of new biomedical materials (including biomaterials) and innovative drug forms; basic, preclinical and clinical research in the areas of medical biology and clinical medicine	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy Livestock production in bioeconomy and the role of industrial symbiosis in bioeconomy	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy Sea, oceans and waters	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy Sea, oceans and waters	Primary production systems – agriculture, forestry, aquaculture, including waste and side streams Food, feed, fibres and bio-based industries Fuels and bio-energy
Access to courses/material	Mixed (open access + material only for students)	Mixed (open access + certifications)	Mixed (open access + open with assessment of personal competenciescertifications)	OpenMixed (open access + certifications)	Depending on educational level	Depending on course

Language	<u>Italian</u> <u>Spanish</u> English	<u>English</u> Bulgarian Czech Polish	<u>Danish</u> English	Finnish English	English	German English
Period of activity	All year round (with Summer schools)	All year round (with Summer schools)	All year round (with Summer schools)	All year round (with Summer schools)	All year round (with Summer schools)	All year round (with Summer schools)
Further info	-	The BBEC CE will become a hub for knowledge exchange, education, cooperation and providing services related to Bioeconomy. This approach enhances the participation and guarantees a substantial interaction between different disciplines in the region and with other BBECs. In order to achieve as many goals as possible a legible structure is necessary. The structure has to allow flexibility and openness in order to integrate and use the existing potential of a scientific network, business, education partners (members of IRWG and other). The BBEC CE will also include cooperation with other valuable on-going initiatives in EU	The BioBEC will coordinate existing educational offers by vocational and academic institutions behind the BioBEC – and probably add ‘missing’ courses to the existing offers due to the cross-silo and cross-institutional nature of the Bioeconomy. We have developed a more detailed project description (in Danish) outside this formula – for the ‘real’ establishment of the Danish BioBEC.	In general, the BBEC’s educational activities are provided by the key actors involved in the BBEC and not directly through the BBEC. The platform is used to promote these educational activities as well as to connect actors to each other.	The Irish BBEC will coordinate existing educational offers by vocational and academic institutions, and through collaboration with industry, third level education providers, and the Irish department of Education. The Irish BBEC will also coordinate with the Irish Knowledge Centre for Climate, Carbon and Community Action (IKC3) to make submissions where it is felt courses are not currently available to meet the demands of the Irish Bioeconomy sector. The Irish BBEC will also operate as an online Knowledge Hub (website, app, social media), with information relating to the bioeconomy in Ireland providing information in other	-

		and/or CEE macro-regional level.			areas including but not limited to: I. Funding; II. Projects; III. Education; IV. Industry; V. Networking.	
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5.2. Specific information on activities

Thanks to the feedback from stakeholders and the internal discussions among partners, a broad range of activities have been identified, many of which cannot be identified as learning activities. In one case – the Med-BBEC – was expressly stated that no educational pathways or education and training courses in a formal way will be provided, acting more as an enabler and broker between demand and offer of Education and Training in bioeconomy rather than an official educational entity.

This kind of input pushed toward the identification of different typologies of activities that the BBEC could offer. In particular, three main typologies were identified, namely:

- Learning activities;
- Experimental and Workplace learning activities;
- Non-learning activities.

These three typologies are further described in the following sections. Within each of these sections, there are several sub-sections, corresponding to the activity descriptors of the template. At the end of the three sections, Table 2 summarises all the activities that, to date, the BBECs are intending to provide.

Learning activities

For learning activities we mean all those activities that can be reconducted to the teacher-pupil formula. In greater detail, all the activities that are designed, developed and/or imparted by a teacher or trainer with the broad scope of increasing knowledge, skills and competencies to learners.

The number of activities of this typology ranges from one (Med-BBEC) to four (German BBEC), with all the other four BBECs that plan two activities. More in detail, looking at how the bioeconomy is addressed, the learning activities described by the BBECs have almost all a holistic vision of bioeconomy, except for the Finnish BBEC which favours the forest-based point of view.

Learning and/or general objective

Although the learning objectives are very varied, the general objectives converge almost all towards two similar purposes: a. creating a common and profound understanding of the bioeconomy in the selected area; b. raising awareness about the potential of bioeconomy.

Level of advancement

The levels of advancement vary greatly both between BBECs and between activities within the same BBEC. This aspect underlines the flexibility of the Centres in targeting different groups of students, with different backgrounds. More in detail, the Finnish BBEC targets “Intermediate level” and “Advanced level”, while the German BBEC ranges from “Beginner/Basic” to “Advanced” accordingly to the type of activity. Instead, all the other BBECs stated they will target for the same activity all the levels of advancement (i.e. Beginner/Basic, Intermediate, Advanced), with the only exception of the Med-BBEC which targets Beginner/Basic and Intermediate and not Advanced.

Entrance requirement

The entrance requirements are closely related to the level of advancement. However, in many cases, the entrance requirement is connected to educational certifications, such as Bachelor’s and Master’s degrees. Nevertheless, there are also courses connected to professions, like the German course for farmers, or open access courses, especially for Beginner/Basic level, such as the Irish webinars. Hence, according to the European Qualification Framework¹, the required levels range from level 1 to level 7.

Skills and abilities provided

Beside the huge variety of skills and abilities provided, the common element for all the BBECs is the willingness to provide both soft and hard skills concerning the bioeconomy.

Contents

The descriptions of the content of the learning activities are detailed according to the BBEC and the typology of the activity. In some cases, the direction and the subjects that will be addressed are already well defined (ex. the Irish BBEC indicates that for each subject – primary production, food, biofuels, sea, water, etc. – the content may include access to finance, information on the bioeconomy in Ireland, promoting bio-based products, etc.). In other cases the description remains at a broader level, indicating concepts of interest (e.g. interdisciplinary, sustainable bioeconomy, sustainable transition, ethics, law regulation, etc.). In both cases, the description of the contents will require greater detail in the future.

Teaching methods & required staff

Teaching methods range from onsite lectures to more innovative methodologies such as group projects or online webinars. Despite the differences between these methods, a propensity to implement student-centre techniques and participatory approaches is common.

¹<https://europa.eu/europass/en/europass-tools/european-qualifications-framework#:~:text=The%20EU%20developed%20the%20European,and%20professional%20development%20across%20Europe>. (Last seen: 25/06/23)

Concerning the required staff, the professional figures most taken into consideration are knowledge providers - researchers, professors, teachers, and trainers. However, in some cases, rather than a knowledge provider the figure requested is more a tutor with expertise in moderating and enabling discussions and the ability to know how to guide students during their studies.

Learning instruments

A wide range of learning instruments is expected to be used. Indeed, together with traditional instruments such as teachers' presentations, handouts, textbooks, use of laboratories, learning journeys and experts' presentations, the Centres will benefit from the use of innovative techniques such as videos, computer labs, e-platforms, gaming and databases. Moreover, other learning instruments indicated by different Centres are: workshops; simulations tools (e.g. simulations of real situations); incubation facilities; network and support; social Media; students presentations; industry presentations; group work; and MOOC. All these activities show the dynamism and the predisposition of the Centres to innovation.

Exploiting pre-existing tools

The exploitation of pre-existing tools represents an element of interest for almost all the BBECs. Indeed, throughout the BBECs there is a commitment to exploit pre-existing tools and build on what is already available in the region. In particular, there are several mentions of specific projects' outcomes or existing educational pathways that might be exploited during the learning activities.

Timing

The most common timing for this typology of activities is once a year. Other timings proposed are monthly and on demand.

Assessment methods

Several assessment methods are planned. In some cases, the attendance is enough to reach the participation certification. Instead, in other cases, when the assessment is foreseen, several options are listed, for example, publishing papers, sitting exams, preparing reports, preparing scientific posters, reflective journals, discussion forums, work experience reports, presenting results, and attending training days. Acquired knowledge transformed into innovation and new businesses can be another 'non-formal' assessment of outcome.

Experiential and Workplace learning activities

Experiential and workplace activities are those training activities that can be reconducted to practice learning or active learning. However, the scope of these activities is always the increase of knowledge, skills and competencies of human resources, but it is achieved throughout the experience.

Three experiential and workplace learning were identified by Med-BBEC and German BBEC, two by Finnish and Irish BBEC, and one activity for the remaining BBECs (Danish, Central-Eastern).

The most common activities of this typology are internships (Med-BBEC, Danish BBEC, Finnish BBEC, Irish BBEC) and mentoring (Med-BBEC, Finnish BBEC).

General objective

Unlike learning activities, where the most repeated dynamic is that of integrating the workforce into the bioeconomy – following the individual-bioeconomy paradigm – in experiential and workplace activities the focus is wider, enlarging the vision towards the bioeconomy-society paradigm. In this case, the involvement of individuals is not the end but the means. For example, internships are not only a way to improve workforce skills and knowledge but also a way of improving the bioeconomy as a whole. In this vein, the Finnish BBEC proposes the integration of international students into the region through internships, importing knowledge, competencies and new approaches from abroad.

Another example is provided by the Irish BBEC, which aims to implement EU study visits to provide information on the Irish bioeconomy to other EU countries/regions.

Finally, the concept of cooperation emerges several times, in particular between Education and Industry, Science and Industry, different bioeconomic sectors and different countries.

Entrance requirement

In general, these activities are defined as open access from BBECs. In some cases, the issue is still in discussion, while in other cases a bachelor's or a master's degree is required. In the most restrictive cases, it is requested to be part of specific institutions (ex. in the German BBEC there is a requirement to be a graduate student from one of the Universities participating in EBU – European Bioeconomy University).

Description of the activities

In accordance with the general objective, the content of these activities aims to place the Centres as connectors between various active actors in the bioeconomy, such as: employees and companies; job seekers and companies; universities and industry; education institutes and companies; national and foreign companies.

Required staff

The education and training component assumes a prominent role in these activities as already seen for learning activities. Nevertheless, there is a request also for administrative staff to support the bureaucratic and administrative issues related to internships, collaborations, mentoring and other activities.

External actors

There is a strong recourse to external actors, especially professionals from the world of industry and bio-based companies. Other actors mentioned are: other BBEC officers, NGOs, government departments, research institutes, science communicators, career offices, volunteer centres, technology transfer centres, business incubators, labour market institutions, associations of students students.

Exploiting pre-existing tools

Also in this case, like the learning activities, there is the possibility to exploit pre-existing tools, but in these cases the material is less structured and often is defined by partners as a “starting point.”

Timing

Due to the strong differences between these activities, also the timing is very different. In some cases, it is still not determined (Danish BBEC), while in others it is foreseeable that the activity will be conducted monthly (Central-Eastern BBEC) or year-round (Med-BBEC). Instead, other BBECs foresee bi-annual (Irish and Finnish BBECs). In particular, the Finnish BBEC, for its internship program plans promotion at the beginning of the spring semester and internships during summertime. Finally, the German BBEC plans once every two years for one activity and continuously (year-round) for the other.

Assessment methods

In general, for these activities are not planned formal assessments, but rather informal methods, such as a co-evaluation between the trainee and host company. However, in some cases also a final grade is foreseen.

Non-learning activities

The non-learning activities are all those activities that the Centres can provide without any learning purpose but functional to the survival of the Centres and, more in general, to the development of the bioeconomy or the bioeconomy education.

In some cases, they are perceived as very important, such as in the Med-BBEC, where non-learning activities have a leading role.

The number of these activities ranges from one (Central-Eastern, Danish, Finnish BBECs) to three (German BBEC), with the Irish and the Mediterranean BBECs that plan two activities of this typology.

General objective

The general objective of these activities is even wider than the one of the experiential and workplace learning activities. Indeed, almost all the activities planned by the BBECs aim to reach as wide an audience as possible, in order to spread the knowledge and awareness of bioeconomy for all the possible stakeholders, such as civil society.

Description of activities

Communication and dissemination represent the main activities of this typology. Indeed, all the BBECs plan to implement strategies for communicating. The Mediterranean BBEC through online and in-person initiatives; the Finnish BBEC through blog texts in the platform; the German BBEC is intending to take part in exhibitions and develop the second edition of a book on bioeconomy; the Danish BBEC aims to implement communication, marketing and networking activities; “networking” is also the key-word of the Irish BBEC; finally, the CE-BBEC supports the exchange of knowledge between stakeholders through online platform.

Other non-learning activities concern the consultancy (German BBEC), and the identification of job profiles for bioeconomy (Med-BBEC).

Required staff

Due to the strong connection with communication and dissemination, the required staff are personnel experts in these subjects. Education experts and project managers are also reported.

External actors

External actors reported are: industry human resources experts; industry representatives; public officers, policymakers, and government departments; research centres; clusters; NGOs; startups; local companies; representatives of education.

Exploiting pre-existing tools

In the case of non-learning activities, communication activity requires a considerable amount of information. Hence, pre-existing tools and materials are fundamental for these non-learning activities.

Timing

The timing is quite different for each BBEC. Indeed, the Finnish BBEC and the CE-BBEC plan once a month. The Med-BBEC foresees the main activity during the year, while the periodical events are every six months/yearly. The German BBEC is on demand, and the Irish one plans half-yearly or yearly. Finally, the Danish BBEC has to define once the centre will begin its activities.

Assessment methods

Due to the high heterogeneity of these activities, and their non-learning nature, the assessment methods were not indicated. Indeed, these activities are not directly connected to students and their evaluation. However, for each of these activities several KPIs might be identified.

Table 2. Summary of activities provided by BBECs

	Med-BBEC	BBEC CE	Danish BBEC	Finnish BBEC	Irish BBEC	German BBEC
Learning activities						
Activity #1	Training the trainers	Providing educational materials and expertise to raise awareness	Coordination of existing biobased educational activities	Forest-based bioeconomy course for students in bachelor level	Irish BBEC Online Knowledge Hub & Coordination of existing biobased educational activities	Projects in Bioeconomic Research - Group Project
Activity #2	-	Sharing information about valuable education and training opportunities (existing)	Running evaluation of needs and improvements	Sustainable forest-based bioeconomy for teachers	Education videos/webinars (for online knowledge hub)	Lecture series: Bioeconomy in practice
Activity #3	-	-	-	-	-	Bioeconomy and sustainability curriculum for schools
Activity #4	-	-	-	-	-	Bioeconomy learning modules for agricultural actors
Activity #5	-	-	-	-	-	MOOC: Concepts of sustainable Bioeconomy
Experiential and workplace						
Activity #1	Online services	Supporting cooperation between science and industry	Creative and on-the-job training and exchange	Integrating international students to the region through internships	EU Study Visits	Regional Innovation Partnerships for Promoting Innovations in Bioeconomy
Activity #2	Internship enabler	-	-	Student mentoring programme	Internships/Job opportunities (through Knowledge Hub)	Additional certificate for master students
Activity #3	Mentoring	-	-	-	-	-
Non-learning activities						
Activity #1	Dissemination & Communication	Supporting the exchange of knowledge between the stakeholders	Communication, networking and marketing	Blog texts in the platform	Bioeconomy Education and Networking day	Exhibition on Bioeconomy: Exhibition in Experimenta

Activity #2	Identification of job profiles	-	-	-	EU Study Visits	Consultancy for biobased companies
Activity #3	-	-	-	-	-	Second edition of Biobased textbook



This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023381. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.

5.3. Readiness to new technologies: digitalization and artificial intelligence (AI)

Digitalisation has had a major impact on teaching activities during the COVID period and is currently one of the main areas of innovation in teaching/learning. Artificial Intelligence (AI) has emerged as a major topic in work and study environments and is now perceived as a potential game changer for many jobs' configurations and for learning processes.

These topics (in particular the first) have been addressed partly explicitly and, to a large extent, implicitly during the implementation of the different WPs and tasks of the BIObec project, because this area of attention is now at the core of most of the education institutions, that are developing e-learning initiatives. This continues to increase in importance in particular for upskilling and reskilling of the workforce where trainees require access to courses in their spare time, easily accessible from their homes or workplaces. The approach of the project was to see these evolutions as an opportunity for increased e-learning and improve the impact of project outcomes. This happened partly on purpose in order to make sure this evolution of technology was embedded in the design of the centres and not an add-on.

Given the relevance of the topic, this section attempts to make explicit the main considerations and lessons learned. These can be organised into two major topics, though the distinction is not always straightforward and as a consequence the two aspects mix up in the practical implementation:

- Implications of the new technologies for the organisation of the centres and of their activities;
- Implications for the contents of the learning activities.

The degree of awareness of the topic can be shown at the higher level of the project implementation by the use of these technologies for the BIObec activities themselves. In particular, for the communication and learning materials, the following uses were made:

- Helping to shape the texts, for example, using Chat GPT for a first draft for the summaries of the roadmap used in the story maps. Large blocks of text were pasted there, and summarised by using the prompt "Summarise this text in [length]". Then, the



produced texts were compared with the original and adapted by a human. Partners were also asked to summarise their answers to the video interview questions by using Chat GPT, in those cases where the answers were too long;

- Improving the quality of the texts by combining the use of the Grammarly add-on with asking for feedback to Chat GPT. Always, of course, overseen by a human expert;
- One of the tools used for the design of the story maps, Genial.ly, uses AI to help shape well-designed, user-friendly content. This tool integrates AI by providing content generation, interactive element suggestions, and personalisation;
- Not only Genial.ly, but also Canva was used for some of the designs. This tool uses as well AI for recommendations, layouts, etc. It has been very useful and accelerated the process of having well-designed content;
- The “automatic subtitles” option was activated for all the YouTube videos (BBEC leaders interviews, workshops and webinars’ recordings). This is also powered by AI and improves communication making those videos accessible for deaf people or people with a lower spoken level of English.

The attention to digitalisation was inherent in the design of the centres. One of the centres in particular (the Mediterranean one) was thought to work as a digital innovation hub without a physical location. Components of e-learning are involved in all centres, which also are expected to adopt different virtual solutions starting with existing on-line materials from previous projects. This topic is particularly relevant in two cases:

- BBECs with a wide geographical scope;
- The exploitation of common resources, also through a potential network of centres.

Three examples of how these technological opportunities fit into the Centres’ design and activities are provided by the Irish, the German and the Mediterranean cases.

In the Irish case, examples include on-line micro-credentials, certificates and Master’s programmes, undergraduate programmes run with the backup of Virtual Learning Environments (VLEs) such as CANVAS and Moodle where all course materials are available online to support in-person teaching, e-learning programmes such as the ICOS Skillnet Bioeconomy Awareness and BioBeo videos and pilot e-learning programme. There are also a significant number of STEM education programmes utilising Virtual Reality (VR) and Augmented Reality (AR) as teaching tools (e.g. REEdI), and particularly in the area of agritech,



businesses are increasingly using VR and AR to train operational and maintenance staff, including those overseas without access to in-country maintenance personnel.

The Irish BBEC will seek to improve the quality and uptake of e-learning solutions while ensuring that students and professionals have also access where required/appropriate to in-person teaching & training. The close relationship with bioeconomy business clusters such as Circular Bioeconomy Cluster South West and Agritech Ireland Cluster means that the Irish BBEC will stay up to date on advances in technology in the workplace and ensure that educational institutions are able to meet the requirements of the workplace, and vice-versa. Educational institutions and teachers/lecturers in Ireland have benefitted post-Covid from a drive in skills development in the e-learning sector, improving the digital skills of teachers and lecturers. Significant work remains to be done however this is a high priority for both government departments and the institutions themselves and therefore extensive resources are being deployed.

In relation to the impact of AI, MTU as an educational institution is keenly aware of the potential impacts of AI on the student experience, workplace environment and the future of the circular bioeconomy. MTU is in the process of drafting a policy on AI in order to guide staff and students and ensure that the benefits of AI are leveraged while remaining vigilant to combat bias and discrimination that AI makes the institution vulnerable to. As the Irish BBEC was planned to sit under the umbrella of MTU, it will therefore be subject to the same policies and procedures as MTU, including in the area of AI.

In the case of Germany (German BBEC), several dimensions of digitalisation and AI are explicitly identified.

Looking into the need and demand from the students to include AI, there is already an infrastructure at the University of Hohenheim that can support the BBEC activities:

- Project AI & Data Science Certification (AIDAHO), which would need to be included for some educational activities of the BBEC;
- The training staff of the centre would need to know about the topic; for that there is already an offer of courses such as “KI-Kompetenzen in Lehrveranstaltungen fördern” or “Digitale Lehr-/Lernszenarien lernförderlich gestalten und zielführend integrieren”

- Team of Coaches for digital learning and teaching, which will be also involved more prominently in the BBEC;
- Rules for student use of AI platforms such as ChatGPT²;
- Internal university access to ChatGPT called GPTalk, in which no chats are saved for data protection issues and access data is not transmitted.

AI tools might play an important role in the German BBEC's activities such as:

- Course "Projects in Bioeconomic Research - Group Project;"
- MOOC: Concepts of sustainable Bioeconomy: especially for the quizzes and reflections.

Finally, in the Med-BBEC case, the themes of digitalisation and VLEs have been explicitly discussed, as these components are crucial in shaping the identity of this BBEC, considering its aforementioned virtual nature. In this vein, during the T3.4 activities the interest that instruments like VLEs may generate, particularly for pedagogical purposes, emerged clearly. Nevertheless, the need to control costs for the establishment of the BBEC precludes the adoption of such costly solutions, preferring more flexible ones such as simple online spaces for collecting training materials from other sources such as other projects. This reasoning is to be considered valid only for the first steps of this BBEC, being clear to all the stakeholders involved in the process of defining training programs that these technologies cannot be ignored for long. Indeed, it is very likely that they will play a key role in the bioeconomy of the future and it will be increasingly necessary to have human resources capable of working with them.

²https://www.uni-hohenheim.de/fileadmin/uni_hohenheim/Intranet_MA/Haeufig-genutzt/Serviceportal_Lehre/Handreichung_ChatGPT%40Universitaet_Hohenheim_EN.pdf (last seen: 27/06/2024)

6. Discussion

In the previous chapter, both for the general aspects of BBECs and for the specific information on activities, the different approaches and objectives of the Centres are evident. From this aspect, several reflections arise.

Firstly, looking at the general information, it is possible to highlight the different configurations that the Centres may assume. This configuration is strictly connected to the different interpretations of the concept of “knowledge hub” that underlies the project and returns an overview of how this concept is developed in the six regions taken into account in the BIObec project. On the other hand, the different interpretations of what the Centres should provide to their customers represented the first obstacle to the identification and description of the activities.

Before any further theoretical considerations on the concept of a “knowledge hub”, from a practical point of view, it is important to underline that thanks to the inputs provided by the six BBECs, everyone interested in replicating the plans and programs for education and training in the bioeconomy can draw from a wide range of solutions and opportunities.

Instead, moving toward the activities proposed, they represent the result of two main elements: the regional/national context (in particular needs, expectations and opportunities), and the expertise of partners and stakeholders involved in each BBEC. In greater detail, the context variables have been already identified and reported in the previous activities of the project, i.e. WP1 and WP2. Instead, the partners' and stakeholders' expertise emerged during the design process and it directly affected the activities proposed. Nevertheless, the involvement of stakeholders is a process still ongoing for some BBECs. It means that once new partners/stakeholders will join the BBECs, new activities may be planned. Furthermore, this aspect represents an important step not only for the design of the educational offer but for the whole process of settlement of the Centres (for example in terms of funds or in-kind contributions).

Looking at these two elements - context and expertise – and at the specificity of the BBECs and their educational and training activities, it is possible to say that, to date, a national vision for these Centres may be the best solution, at least for the educational activities. This thesis is also supported by the fact that in many countries the concept of “bioeconomy” is still little



known, making it difficult to widely involve stakeholders in such activities. In some countries, there is a lack of a common understanding of the bioeconomy as a vision, and consequently, this complicates the possibility of cross-borders collaboration

However, this does not mean the BBECs should not have an international vision and a strong European network. On the contrary, from the description of activities emerges a high number of similarities, such as the communication and dissemination purpose or the will of providing introductory courses on the bioeconomy, that testify to the importance of central European coordination of the regional/national BBECs to optimize resources, opportunities and strengths.

To summarize, the model of BBEC that emerges from Task 3.4 is a Centre that has a transversal vision of the European and national contexts (sources of inputs), and a deep country-based educational offer (sink of outputs). These two elements – the transversal vision and the vertical country-based root – retrace the T-shaped model of education that characterizes bioeconomy education. In this model, the sectorial skills are developed in “standard” curricula (deep knowledge in one sector, represented by the vertical bar of the T) and they are complemented with a transversal knowledge of all the sectors that compose the bioeconomy (represented by the horizontal dash of the T). Hence, taking this model in mind, it is possible to say that it influences not only the epistemology of the activities but also the identity itself of the BBECs, whatever definition of “knowledge hub” they assume.

7. Conclusions

The study described in this report summarises the plans for vocational, academic and life-long-learning programmes for the six BBECs developed during the BIOBEC project. The description goes beyond the contents of courses for the existing workforce (originally planned), as the regional needs recorded asked the centres to span different levels of education and training and to go much beyond delivery courses, as described in the centres' activities. On the other hand, the description of both the educational identity and the educational offer of the Centres is still far from being exhaustive, as it must be taken into consideration that only during the implementation phase all the missed parts will be defined. Indeed, at this stage, the settlement of the Centres, although on a good track, is too far from the political, economic and social contingencies of the real world that oblige to a reality-check of what is proposed on the market. Hence this document neither claims to include all the possible activities the Centres may offer.

Nevertheless, looking at the general and specific objectives that the Centres set, it is possible to say that all the 6 BBECs have ambitious goals, with a strong propensity to make an impact on people and society. Indeed, all the Centres span a broad range of activities, such as: internationalization; exchanges of workers and students; bilateral industry-research interconnections; connection unemployed people-world of the job; connection public administrations and industry; networking and improvement of the bioeconomy value network; stakeholder engagement; awareness raising; implementation of new bio-based technologies; consultancy for startups; and, more in general solving global sustainability challenges.

However, to implement these ambitious objectives there are some necessary points to be addressed by each BBEC, namely:

- a. A good governance structure that is suitable for the stakeholders' involvement and networking purposes;
- b. Access to an economic/financial expert to assess the sustainability of the BBEC business plan and assist with accessing funds; y
- c. A continuous interface with the other BBECs and, possibly, with central coordination to maintain an international/European vision and to avoid waste of resources, opportunities and value.



Another important aspect is the increasing interest in the bioeconomy to the aforementioned T-shaped education model where sector skills developed in “standard” curricula are complemented with a vision of the bioeconomy, knowledge of different bioeconomy sub-sectors and transversal skills like system-thinking, innovation management and (self-) entrepreneurship. This aspect represents a challenge not only for students but also for trainers. Indeed, just as it is not easy to include these skills within targeted courses for students, it is not easy to identify trainers who are qualified to be able to educate about the bioeconomy.

The points listed so far represent internal challenges, but also external challenges may affect the Centres’ educational activities and could require a deep discussion within and among the BBECs. One of these is represented by new technologies, such as AI, machine learning, etc. Thanks to these technologies, in a few years (or even less) the education and training sector might deeply change, requiring new expertise, competencies and knowledge. Many signals in this direction are already embedded in the centres design and practices, though not fully used at the moment. The Centres, however, being at the interconnection between up-to date education institutions, being already largely designed to use e-learning and digital technologies, and addressing learning processes through a continuous update in contents and instruments, appear in the best position to exploit the new opportunities arising.

Furthermore, another challenge is the development of the concept of bioeconomy itself and the relevant technologies and problems encompassed by the bioeconomy. In fact, these technologies may be (most likely will be) subject to change in the next years, due to their strong connection to innovation and the very quick transformations in many sectors, both inside and outside the current bioeconomy, letting alone the role in lifestyles and policy.

Hence, to be ready or at least aware of this change is a fundamental issue for the BBECs to envisage future-scanning activities and having in mind alternative options in larger set of potential activities. In other words, it is fundamental to design contingency plans, in such a way as to be able to adapt to uncertain futures and rather exploit opportunities arising.

Indeed, once the BBECs enter the market, their ability to foresee the threats as well as to seize opportunities in the bioeconomy education and training will be critical for their survival.

8. Annexes

Annex 1

The blank “Description of activities template”

Background & Aim of the Document

The present document aims to provide plans for vocational, and academic education, and lifelong learning programs for the existing workforce. In particular, it will specify **learning objectives, entering requirements, skills, contents** (topics), **teaching methods**, and **learning instruments**. Moreover, in this form, it will specify all the **non-learning activities** that the BBEC will provide.

It represents a concrete reality check of **the activities planned** in the centres and could provide models for other centres and replicators. The plans will take into account the interplay of the different levels/types of education, with respect to the local and international needs of the industry and other players. It will also provide a connection with other information/education needs (e.g. consumers, policymakers, etc.).

The form is structured in **four modular sections**, namely:

- Section 1. General information; it aims to collect information about the mission of the Centre, describing the principal dimensions of the Centre itself such as the *targeted educational level(s)*, or the main *value chains* involved;
- Section 2. Learning activities information; in this section the BBEC’s partners should provide a preliminary description of the main activities of the BBEC, explaining, for each learning activity, a list of descriptors (Learning objectives, entering requirements, skills provided, etc.);
- Section 3. Experiential and workplace learning activities information; the objective of this section is to provide an explanation of all the training activities that are not strictly learning ones such as mentoring, internships, etc.
- Section 4. Non-learning activities information; in this section the BBEC’s partners should provide a description of all the non-learning activities that the Centre might provide (e.g. identification of skills profiles for bioeconomy, or communication activities).

[NAME] BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If "Other" specify: Click or tap here to enter text.

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: Click or tap here to enter text.

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Click or tap here to enter text.

Language

Click or tap here to enter text.

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

Click or tap here to enter text.

SECTION 2. Learning activities information

Activity 1 – [name]

Learning and/or general objectives

Click or tap here to enter text.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Click or tap here to enter text.

Skills and abilities provided

Click or tap here to enter text.

Contents (topics)

Click or tap here to enter text.

Teaching methods & Required Staff/Expertise

Click or tap here to enter text.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If “Other” specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.

Activity 2 – [name]

Learning and/or general objectives

Click or tap here to enter text.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Click or tap here to enter text.

Skills provided

Click or tap here to enter text.

Contents (topics)

Click or tap here to enter text.

Teaching methods & Required Staff/Expertise

Click or tap here to enter text.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If “Other” specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.

Activity 3 – [name]

Learning and/or general objectives

Click or tap here to enter text.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Click or tap here to enter text.

Skills provided

Click or tap here to enter text.

Contents (topics)

Click or tap here to enter text.

Teaching methods & Required Staff/Expertise

Click or tap here to enter text.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If “Other” specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.



[If you need to describe more learning activities, please, just copy and paste the form before the next section and fill it.]

...



This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023381. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.



SECTION 3. Experiential and workplace learning activities information

Activity 1 – [name]

General objectives

Click or tap here to enter text.

Entering requirements

Click or tap here to enter text.

Description of the activity

Click or tap here to enter text.

Required Staff/Expertise

Click or tap here to enter text.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.

[If you need to describe more semi-learning activities, please, just copy and paste the form before the next section and fill it.]

SECTION 4. Non-learning activities

Activity 1 – [name]

General objectives

Click or tap here to enter text.

Description of the activity

Click or tap here to enter text.

Required Staff/Expertise

Click or tap here to enter text.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Click or tap here to enter text.

Assessment methods

Click or tap here to enter text.

[If you need to describe more non-learning activities, please, just copy and paste the form before the next section and fill it.]

Annex 2

The 6 BBECs “Description of activities template”

MED-BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If “Other” specify: [Click or tap here to enter text.](#)

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If “Other” specify: [Click or tap here to enter text.](#)

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Mixed: open access to some materials, fees for services

Language

English, Italian, Spanish

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

The MED-BBEC is intended to valorise existing teaching material first and then creating common teaching materials. So, it will not provide its own educational pathways or education and training courses in a formal way. Indeed, it is intended to play as enabler and broker



between demand and offer of Education and Training in bioeconomy. In this view, it will be connected with all the education entities at any educational level (academic, VET, lifelong learning) and at any geographical level (local/regional, national, European, international) providing a wide web of opportunities to its customers.

Hence, all the answers given in this section must be read in this perspective, with the consequent repercussions in terms of governance and economic and financial management (a lighter and more flexible structure).

SECTION 2. Learning Activities information

The MED-BBEC will not provide directly learning activities in the first stages. The core activities will be set among the experiential and workplace learning activities information and non-learning activities. However, later in time, it would probably provide lifelong learning for trainers with specific pathways.

Activity 1 – “Training the trainers”

Learning and/or general objectives

The two main learning objectives for learners will be:

- a) increasing knowledge, competencies and skills in teaching bioeconomy; and
- b) raising awareness in existing methodologies, approaches and tools in teaching to different levels of education.

The course will be tailored on the learners’ background (e.g. specific courses for school teachers or for lifelong learning trainers).

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Preferably being a teacher, trainer or professor.

Skills and abilities provided

Teaching skills; ability to explain the vision of bioeconomy; ability to reconnect and teach the different sectors composing the bioeconomy sector; ability to design projects for students involving other professionals or colleagues; team working;

Contents (topics)

The course will be divided in two main parts. The **first part**, more theoretical but shorter, will provide to teachers and trainers an overview of the state of the art in bioeconomy. Furthermore, all its implications, perspectives, limits and strengths will be explained to learners. After that, the **second part** will focus on the pedagogical issues: methodologies, approaches and tools will be taught to learners with practice and an action-oriented approach.

Teaching methods & Required Staff/Expertise

Teaching methods: Mixed, both theoretical and practical. *Required staff/expertise:* First part bioeconomy experts; second part education experts trained in bioeconomy.

Learning instruments

Textbook

Teacher presentation

Group projects

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: workshops; simulations of real situations in the classroom.

Exploiting of pre-existing tools/learning material

Yes, it will be used all the specific material coming from projects, online platforms, or websites in the scope of bioeconomy.

Timing (e.g. monthly, half yearly, yearly, etc.)

TBD

Assessment methods

A certificate of participation will be released to all the students that will exceed a certain amount (e.g. 80%) of hours.

SECTION 3. Experiential and workplace learning activities information

Activity 1 – Online service (platform)

General objectives

Valorisation of existing teaching material first and then creating common teaching materials;

Entering requirements

Possible fees for accessing to some materials.

Description of the activity

Collection & selection of teaching material (copyright check); and

Updating old material and creation of new one;

Required Staff/Expertise

Required staff: Education experts; *Expertise:* Good knowledge of the existing material in bioeconomy education and training in the selected area (Italy or Spain) and for the selected educational levels (university, VET, lifelong learning).

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes. It represents the core of this activity.

Timing (e.g. monthly, half yearly, yearly, etc.)

All the year

Assessment methods

-

Activity 2 – Internships enabler

General objectives

Matching human resources and industries enabling the internships. The scope of the activity is to provide training through the practical learning. Furthermore, the ambition is to establish a win-win approach, providing the right human resource to the company and, on the other hand, provide a job opportunity to the human resource.

Entering requirements

No specific entering requirements.

Description of the activity

The Centre will act as broker between firms and those who apply for the internship. Moreover, the Centre will take care of all the bureaucratic and administrative steps to finalize the internship.

The intern will be followed by a tutor that will evaluate her/his progresses and her/his satisfaction. Also the company’s opinion will be took into account.

Required Staff/Expertise

Required staff: Administrative staff; *Expertise:* legal, administrative and bureaucratic expertise for national and international internships; *Required staff:* Tutors; *Expertise:* HR

External actors involved

Yes



No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Industry, firms, NGOs, Public-Private entities

Exploiting of pre-existing tools/learning material

-

Timing (e.g. monthly, half yearly, yearly, etc.)

Yearly

Assessment methods

The assessment might be done during the internship (mid-term) and at the end. The assessment could concern both the trainee and the host company.

Activity 3 – Mentoring

General objectives

Similarly to the internship, the scope of the activity is to provide training through the practical learning and taking advantage from the experience of professionals.

Entering requirements

No specific entering requirements.

Description of the activity

The Centre will act as broker between firms and those who apply for the mentoring service. Moreover, the Centre will take care of all the bureaucratic and administrative steps to finalize the activity.

The students will be tutored by an expert that will follow their progresses and their satisfaction. Also the company's opinion will be taken into account.

Required Staff/Expertise

Required staff: Administrative staff; *Expertise:* maintain relations with industry and firms;

Required staff: Tutors; *Expertise:* HR

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Industry, firms, NGOs, Public-Private entities

Exploiting of pre-existing tools/learning material

-

Timing (e.g. monthly, half yearly, yearly, etc.)

All the year.

Assessment methods

No assessments expected.

SECTION 4. Non-learning activities

Activity 1 – Dissemination & Communication

General objectives

Increasing public awareness about bioeconomy and bioeconomy education and training.

Description of the activity

The objective could be achieved through several actions like info-days, workshops, conferences or online activities.

Required Staff/Expertise

Communication and dissemination experts.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes, especially for infographics, data, videos and communication materials.

Timing (e.g. monthly, half yearly, yearly, etc.)

One event every 6 months.

Assessment methods

-

Activity 2 – Identification of job profiles, priorities, skills, and education and training needs

General objectives

Maintaining up to date the Centre in terms of job trends, industrial and private sector needs, education and training for public administration, possibilities for marginalized people (e.g. NEETs).

Description of the activity

Identification of *personas* and coherent pathways (together with industry and/or public administrations);

Continuous update of needs, priorities and, consequently, update of *personas*;

Organization of periodical events (e.g. annually or half yearly);

Workshops or conferences with all the relevant actors; and periodical surveys to involved firms and public entities.

Required Staff/Expertise

Human Resources experts

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Industry Human Resources experts; Industry representatives; Public officers; Policymakers.

Exploiting of pre-existing tools/learning material

Yes, outcomes from specific projects on the topic.

Timing (e.g. monthly, half yearly, yearly, etc.)

Main activity during all the year; The periodical events every six months/yearly.

Assessment methods

-

Finnish BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If "Other" specify: Click or tap here to enter text.

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: Click or tap here to enter text.

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Open access to interested participants (including companies, students, and researchers) that work within forest-based bioeconomy.

Language

Finnish and English

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

In general, the BBEC's educational activities are provided by the key actors involved in the BBEC and not directly through the BBEC. The platform is used to promote these educational activities as well as to connect actors to each other.

SECTION 2. Learning activities information

Activity 1 – Forest-based bioeconomy course for students in bachelor level, University of Applied Sciences and University of Eastern Finland

Learning and/or general objectives

Create a profound understanding regarding forest-based bioeconomy.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Bachelor level students

Skills and capabilities provided

Basic understanding of the business field, its operating environment, and the changes affecting it.

Contents (topics)

Concepts regarding sustainable bioeconomy, sustainability transitions and operational environment, industry transformation

Teaching methods & Required Staff/Expertise

Onsite lectures with slides and a teacher with knowledge in forest-based bioeconomy

Learning instruments

Textbook

Teacher presentation

Handouts



- Databases
- Video
- e-platform
- Gaming
- Computer lab
- Learning journey
- Use of laboratories
- Other

If "Other" specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes, other related course material

Timing (e.g. monthly, half yearly, yearly, etc.)

During autumn semester

Assessment methods

Passed/failed, online exam/learning essay

Activity 2 – Sustainable forest-based bioeconomy for teachers

Learning and/or general objectives

To create profound and common understanding on the sustainability transition affecting the forest-based bioeconomy among teachers at Karelia university of applied science, university of Eastern Finland and Riveria vocational school and to share ideas, methods and knowledge between the three organisations.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Teachers at the three levels in forest-based bioeconomy related topics

Skills and capabilities provided

Provide and exchange recent science-based, expert-level knowledge on forest-based bioeconomy and its relation to sustainability transitions.

Contents (topics)

Forest-based bioeconomy in sustainability transition, systemic change, socio-economic-technical level

Teaching methods & Required Staff/Expertise

A workshop is organised for teachers in three educational levels to create new knowledge on sustainability transition affecting the forest-based bioeconomy. First, lectures are given by experts representing different perspectives and then a collaborative workshop is organised in which teachers are discussing the topics together and sharing ideas. Expertise: Senior level experts in forest-based bioeconomy.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Workshop

Exploiting of pre-existing tools/learning material

Possibly yes if needed

Timing (e.g. monthly, half yearly, yearly, etc.)

Organised once during spring semester

Assessment methods

No assessment required

SECTION 3. Experiential and workplace learning activities information

Activity 1 – Integrating international students to the region through internships

General objectives

To integrate international students to the North Karelia region through internships in local companies. Furthermore, to provide international networking possibilities for the local companies.

Entering requirements

Bachelor-level student from international programmes

Description of the activity



Some of the international students have to do an internship in their master's programme. Often these students go back to their own countries instead of staying in Finland. Hence, the students could do their internships in the North Karelia region and benefit the local companies by providing information on international markets etc. BBEC promotes the students' and their skills to the local companies.

Required Staff/Expertise

BBEC coordinator and university representative

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Local companies

Exploiting of pre-existing tools/learning material

No

Timing (e.g. monthly, half yearly, yearly, etc.)

Promotion in the beginning of spring semester and internships during summertime

Assessment methods

The students and the companies involved are asked to provide feedback on the process

Activity 2 – Student mentoring programme

General objectives

To provide a mentoring programme for students to support their master thesis execution. Furthermore, to create link between the students and local companies and support students in their career planning.

Entering requirements

Master's level student

Description of the activity

A master-level student, university representative with specific knowledge on forest-based bioeconomy and a local company are part of a mentoring group through which the student gets support for his/her thesis work. Through the mentoring group the company will gain connections to the university and specific expertise on forest-based bioeconomy. The student will gain relevant knowledge from the field as well as support from the university. Possibly, the student can get paid for the thesis work if agreed so.

Required Staff/Expertise

University representatives (doctoral level)

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.):
Company representatives

Exploiting of pre-existing tools/learning material

Thesis work guidelines

Timing (e.g. monthly, half yearly, yearly, etc.)

Throughout the year

Assessment methods

Thesis work is graded, and all mentoring group members evaluate the process at the end.

SECTION 4. Non-learning activities

Activity 1 – Blog texts in the platform

General objectives

Increasing public awareness about forest-based bioeconomy and related issues in education, research and business.

Description of the activity

Platform users from different organisations provide blog texts to the platform monthly to provide knowledge on various forest-based bioeconomy related issues.

Required Staff/Expertise

Platform coordinator and experts from key actor organisations.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes, any kind of materials that relate to the blog text topics

Timing (e.g. monthly, half yearly, yearly, etc.)

Once a month

Assessment methods

Not required

Danish/Central Denmark Regional BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If "Other" specify: **Job exchange**

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: two foci apart from the broad perspectives: Livestock production in bioeconomy and the role of industrial symbiosis in bioeconomy

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

This depends on the specific courses chosen and the level in the Bologna educational framework scale. We will have a main focus on Qualification frame levels 4-5-6 – (7) using both the ordinary educational system and also the 'life-long educational system' available in DK. We expect that most courses will be with open access or open with assessment of personal competencies.

Language

Most courses will be in Danish. However, we can/will also make international courses and collaboration with other BBECs – especially on levels 6-7.

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC



The BioBEC will coordinate existing educational offers by vocational and academic institutions behind the BioBEC – and probably add ‘missing’ courses to the existing offers due to the cross-silo and cross-institutional nature of the Bioeconomy. We develop a more detailed project description (in Danish) outside this formula – for the ‘real’ establishment of the Danish BioBEC.

SECTION 2. Learning activities information

Activity 1 – [Coordination of existing biobased educational activities]

Learning and/or general objectives

This is a key point of the Central Denmark regional BioBEC: to establish a coordination and common marketing of the existing educational offers. Thus, the BioBEC will become a coordinating hub between 8-12 existing educational institutions within the field.

The existing educational institutions will be invited to join the common marketing of their courses to attract new students/customers depending on the nature of the educational activity and type of institution.

Specific learning objectives will be presented for each course/ each line of education but the overall objectives are to educate students/customers with or without bioeconomic work experiences to navigate with a new level of understanding and new insights, new network within the field.

Some will need basic broad courses, other practical on-the-job training and again others more specialized/advanced education in e.g. Biogas management, in industrial symbiosis, courses on ESG certification needs, or knowledge about potentials for Biobased textiles.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Entering requirements depends on the educational institution and the requirements for each Qualification frame levels 4-5-6 – (7). Some may start very basic without any formal education, others at rather advanced levels. Each course/education has its own specific requirements. Assessment of academic and work-life experience will be taken into account.

Skills and abilities provided

Each course/education has its own specific educational targets

Contents (topics)

The BioBEC educational topics/programme is described in detail in each of the educational institutions. None of these, however, today market such courses as Biobased education, so

the descriptions may become adapted when the BioBEC is established and the formal cooperation has started.

Some headlines/directions can be listed here according to the level in the EU Qualification frame. This list is dynamic and will develop further.

Basis/education

- Introduction to Bioeconomy: definition, delimitation/scope, historical background, examples
- Biomass and energy
- Bioeconomy and livestock production
- Bio-based materials
- Bioeconomy and climate, what is CO₂ and the other greenhouse gases.
- Bioeconomy and policy regulation

Knowledge (Typical lectures, reading etc.)

- Bioeconomy concepts and applications
- Industrial symbiosis in the bioeconomy
- Bioenergy: production and utilization
- Biotechnology and biofuels
- Biorefining
- Bioeconomy and sustainable agriculture (farming)
- Bio-process engineering

Skills (practising the use of tools, models, etc., understanding of)

- Biotechnology
- Sustainable agriculture and food
- Environmental impact of systems
- Technical disciplines: Process, chemistry, IT
- Business understanding and creation in the bioeconomy.
 - o Cross-disciplinary understanding
 - o Laws, regulations, etc.
 - o Management aspects in the bioeconomy

Teaching methods & Required Staff/Expertise

Existing teachers in the educational institutions – but perhaps involving teachers from other 'levels' e.g., a University professor at a business education programme or vice versa. Also, experts and other experienced personnel from the industry will be used.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Incubation facilities, network and support, Simulation tools

Exploiting of pre-existing tools/learning material

Tools and materials used by existing institutions will be applied and if needs occur during the transdisciplinary educations, new tools may be developed

Timing (e.g. monthly, half yearly, yearly, etc.)

This again depends on every single course offered by the existing educational institutions. Merging the whole pamphlet of courses, we can probably offer education/skills development all year around, some very short (hours – days), other weeks to months and the idea is that a student/customer can design their own competence improvement and acquire the ECTS points accordingly.

Assessment methods

Some courses/educations have formal exams to pass and a diploma to achieve. Other educational offers are shorter and 'here and there' additions to personal skills depending on the needs.

Activity 2 – [Running evaluation of needs and improvements]

Learning and/or general objectives

Apart from marketing and running existing courses/education, we will have a competence board to evaluate the needs and initiate the development of additional education needed in the BioBEC.

This board will meet regularly to evaluate whether we need to develop further educational bits/offers.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Not known yet

Skills provided

Not known yet

Contents (topics)

Not known yet – to be developed

Teaching methods & Required Staff/Expertise

Not known yet – to be developed

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If “Other” specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Not known yet – to be developed

Timing (e.g. monthly, half yearly, yearly, etc.)

Not known yet – to be developed

Assessment methods

Not known yet – to be developed

[If you need to describe more learning activities, please, just copy and paste the form before the next section and fill it.]

...

SECTION 3. Experiential and workplace learning activities information

Activity 1 – [Creative and on-the-job training and exchange]

General objectives

Some transdisciplinary courses require new/experimental and/or job training/job exchange (new learning fora) to be able to understand complex interrelationships between separate sectors and disciplines.

The objective is to open the eyes to the ‘known unknowns’ and the ‘unknown unknowns’ within the bioeconomy.

Entering requirements

To be determined (tbd)

Description of the activity



tbd

Required Staff/Expertise

tbd

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): BioBec partners could be used for the exchange of students (to education, but indeed also for business internships across borders), to offer international courses, but it could also be the use of NGOs for local/global perspectives or it could be to use legislative competencies for ESG certification methods

Exploiting of pre-existing tools/learning material

Survey of methods/tools to learn will be conducted

Timing (e.g. monthly, half yearly, yearly, etc.)

Tbd

Assessment methods

Tbd

SECTION 4. Non-learning activities

Activity 1 – [Communication, networking and marketing]

General objectives

To establish a BioBEC we need to learn from existing education activities, but also to see these together in a new perspective and communicate to new audiences who did not know their needs.

The objective here is to design and market a bouquet of ‘separate’ education offers as a needed tool for both:

- the educational institutions to reach new customers, but indeed also for
- bioeconomic businesses to understand how their workforce needs new competencies and networks for the future.

Indeed, we will also work actively for international /inter-BioBEC cooperation and exchange of students and employees. This will become an integral part of the Hub description and marketing: the opportunities to exchange with and learn in other BioBECs.

Description of the activity



This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union’s Horizon 2020 research and innovation programme under grant agreement No 101023381. The JU receives support from the European Union’s Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.



Knowing the educational framework is a prerequisite to reorganising the offers and designing and communicating the new bouquet of educational bits and pieces that could be used for your lift in competencies needs for the biobased future

Required Staff/Expertise

An educational leader is needed to compare and contrast the existing offers and a board is needed to increase the level of competencies to understand the relevant educational landscape. In addition to this, a skilled communication person is needed to tell the new biobased stories and to design and implement the new web-based hub offering new educational perspectives. A CEO of the BioBEC and an experienced communication officer will be employed, when financing has been made available. Their personal skills and experiences will be crucial to establish the hub and the communication strategy

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): The educational /scientific Board, including representatives from ministries, businesses, local authorities and educations

Exploiting of pre-existing tools/learning material

We will establish close cooperation with the other BioBECS to inspire one another

Timing (e.g. monthly, half yearly, yearly, etc.)

When funds for the establishment of the BioBec has been made available, the CEO and the communication officer will be employed

Assessment methods

tbd

Irish BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning



Entrepreneurship training

Other

If "Other" specify: [Click or tap here to enter text.](#)

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: [Click or tap here to enter text.](#)

Principal entry requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Entry requirements will be dependent on the specific targeted educational level. For vocational training, courses of this type are offered if you are unemployed, redundant or no longer in full-time education free of charge with open access. The lifelong learning education will be delivered free of charge with open access while the academic courses offered in Ireland are open access with assessment of personal competencies. Funding for the academic courses is available under the Springboard program, an upskilling initiative in higher education. It offers free courses at certificate, degree and masters level leading to qualifications in areas where there are employment opportunities in the economy including the bioeconomy. Springboard+ courses provide job-readiness training and most offer the opportunity for work placement, project-based learning or industry site visits where appropriate. Perspective students with the required educational experience pay a small percent of the course fee.

Language

English

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

The Irish BBEC will coordinate existing educational offers by vocational and academic institutions, and through collaboration with industry, third level education providers, and the Irish department of Education. The Irish BBEC will also coordinate with the Irish Knowledge Centre for Climate, Carbon and Community Action (IKC3) to make submissions where it is felt courses are not currently available to meet the demands of the Irish Bioeconomy sector. The Irish BBEC will also operate as an online Knowledge Hub (website, app, social media), with information relating to the bioeconomy in Ireland providing information in other areas including but not limited to:

- I. Funding (EU/Irish grants, how to apply),
- II. Projects (Consortium Building, Stakeholder engagement, Project results Library),
- III. Education (Webinars, Public Engagement, Single point of entry to bioeconomy education (BBEC)),
- IV. Industry (Advert bioeconomy jobs/opportunities, Link Education and Industry, Value chain collaboration),
- V. Networking (Study visits, EU/ Irish Events, Knowledge Exchange, Irish bioeconomy directory).

ACTION 2. Learning activities information

Activity 1 – Irish BBEC Online Knowledge Hub & Coordination of existing biobased educational activities

Learning and/or general objectives

The objective of the Irish BBEC is to provide an online knowledge database for all Irish bioeconomy stakeholders to contribute by identifying their needs, expertise, resources and areas of study. The Irish BBEC will coordinate and market the educational courses on offer at the various levels, acting as a coordinating hub between existing educational institutions and their bioeconomy related offerings. There are currently a number of Bioeconomy based educational programs on offer in Ireland at various levels in Ireland and this coordination is seen as vitally important to attract prospective students, reduce the risk of course duplication and design course content in line with industry needs. The existing educational institutions will be invited to join the common marketing of their courses to attract new students/customers depending on the nature of the educational activity and type of institution.

Level of advancement

Beginner/basic

Intermediate

Advanced

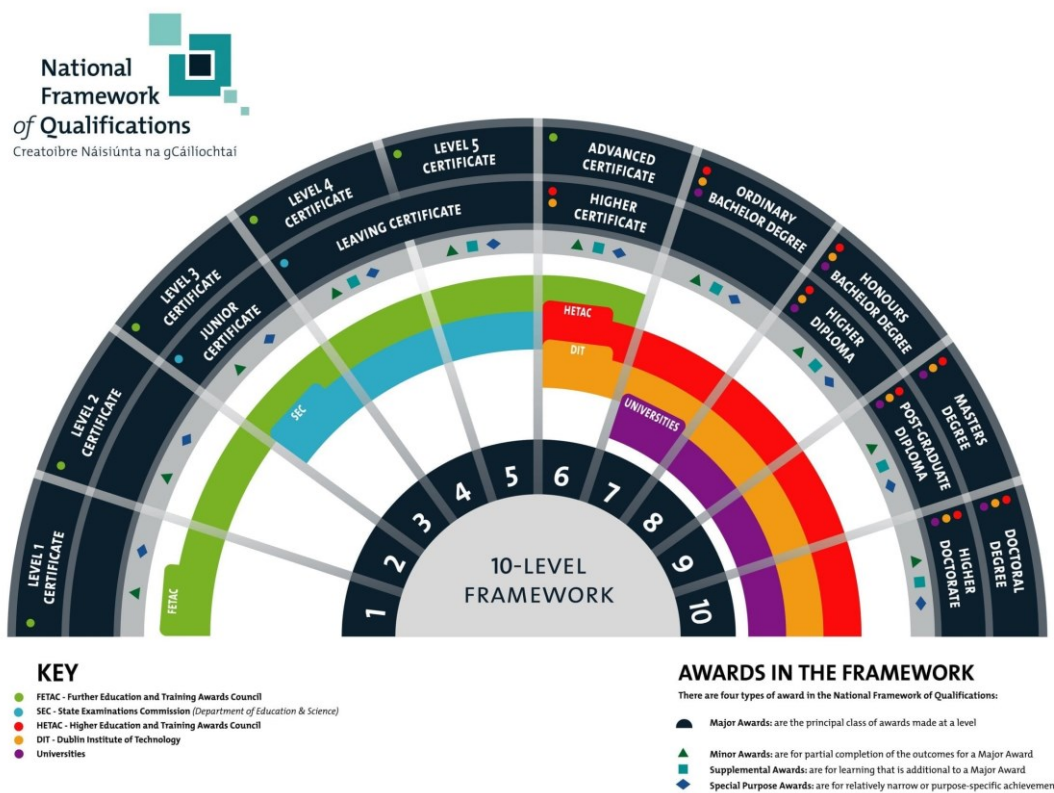
Entering requirements

Entry requirements will be dependent on the educational institution and the requirements for each course will vary. Adopting the existing National Framework for qualifications (NFQ) overseen by Quality and Qualifications Ireland (QQI) will aid in promotion, development, maintenance, and standardisation relating to different qualifications or awards to one another. QQI issues NFQ guidelines to providers to support the interpretation and



implementation of the NFQ and its award-type descriptors will be available for all hosted/promoted programmes.

Some courses may start very basic without any formal education, others at rather advanced levels example may be a QQI level 1 course for transition year students, while QQI level 10 is assigned on completion of a doctoral degree.



Skills and abilities provided

Range of skills provided relevant to the bioeconomy depending on topic selected, student needs and industry demand.

Contents (topics)

- Primary production systems – agriculture, forestry, aquaculture, circular economy, including waste and side streams ,

- Food, feed, fibres and bio-based industries
- Biofuels and bio-energy
- Blue bioeconomy

The Irish BBEC will also host information on areas such as Funding (EU/Irish grants, how to apply), Projects (Consortium Building, Stakeholder engagement, Project results Library), Education (Webinars, Public Engagement, Single point of entry to bioeconomy education (BBEC)), Industry (Advert bioeconomy jobs/opportunities, Link Education and Industry, Value chain collaboration), Networking (Study visits, EU/ Irish Events, Knowledge Exchange, Irish bioeconomy directory).

Teaching methods & Required Staff/Expertise

1. Teaching method: Class based, presentations, videos, e-learning platforms, laboratory work, online educational webinars, online lectures, work experience with industry and preparation of papers and reports.
2. Required staff: One or two full-time employees to take care of daily implementation of the Irish BBEC and leveraging the existing educational providers for course content. There will also be significant input from Irish bioeconomy stakeholders on a regular basis

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: [Click or tap here to enter text.](#)

Exploiting of pre-existing tools/learning material

The Irish BBEC will make use of existing programs and learning materials. The Irish BBEC will provide results from previous EU and Irish funded projects. The Irish BBEC will also provide expertise from industry stakeholders working in the bioeconomy sector.

Timing (e.g. monthly, half yearly, yearly, etc.)

Education programs will continue all year, The Irish BBEC portal will update program training and skills information at regular intervals as new services come online.

Assessment methods

Assessment will be designed inline with course content, level, and specific institutional requirements. Assessments may include but are not limited to: publishing papers, sitting exams, preparing reports, preparing scientific posters, reflective journals, discussion forums, work experience reports, presenting results, attending training days or just listening, learning and enjoying insightful masterclasses.

Activity 2 – Education videos/webinars (for online knowledge hub)

Learning and/or general objectives

The Irish BBEC described in Activity 1 will host educational videos and webinars. The videos/webinars will be both created specifically for the Irish BBEC as well as sourcing content from past projects, industry and partner educational institution resources. Examples of previous webinars that could be used include MTUs “Winter Webinar” series hosted as part of the Coopid project and links to Teagasc’s signpost series of webinars and podcasts. Projects that IBF are involved include MPowerBIO and BioeconomyVentures that have produced webinars aimed at helping start-ups access finance. The project RuralBioUp also aims to gather information on bioeconomy education webinars. Webinars can also be created for the Irish BBEC specifically aimed at the Irish bioeconomy landscape such as a webinar based on Irish public and private financing options and a webinar based on employment opportunities in the Irish bioeconomy.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

No entry requirements

Skills provided

Educational webinars on bioeconomy, disseminating project results, promoting the Irish bioeconomy and the educational courses currently available.

Content (topics)

Content will be based on previously discussed subject matters:

- Primary production systems – agriculture, forestry, aquaculture, circular economy, including waste and side streams ,

- Food, feed, fibres and bio-based industries
- Biofuels and bio-energy
- Blue bioeconomy
- Clustering
- Circular Economy
- Climate Innovation & entrepreneurship

Content will vary depending on the specific webinar selected but may include access to finance, information on the bioeconomy in Ireland, the role of the bioeconomy as Ireland transitions to a low carbon economy, promoting bio-based products, waste valorisation and disseminating project results.

Teaching methods & Required Staff/Expertise

Teaching method will be through online webinars. Required staff will include subject matter experts, academic researchers, cluster members, individuals with industry experience and representatives from bioeconomy related national regulatory bodies.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

The webinars will exploit pre-existing material, create new material and encourage other interested stakeholders to create material. It is anticipated increased activity will increase demand for future content.

Timing (e.g. monthly, half yearly, yearly, etc.)

Monthly.

Assessment methods

Feedback forms and in-session polls to quantitatively assess the webinars.

SECTION 3. Experiential and workplace learning activities information

Activity 1 – EU Study Visits

General objectives

- Provide information on Irish bioeconomy to other EU countries/regions
- Climate Leadership program
- Deep demonstrations
- Innovation sprints and challenges
- Design Thinking
- Study Visits

Description of the activity

Host events and organise study visits for Irish bioeconomy stakeholders to other countries to gather information on their bioeconomy and to provide

information on Ireland's bioeconomy. Irish stakeholders leverage their network of EU bioeconomy stakeholders from previous/current EU projects.

Required Staff/Expertise

Education institutions staff, cluster members and Irish bioeconomy stakeholders.

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Past study visits have included third-level students, Government departments, research centres, clusters and NGOs.

Exploiting of pre-existing tools/learning material

Using information on past study visits.

Timing (e.g. monthly, half yearly, yearly, etc.)

Half-Yearly

Assessment methods

No assessment methods.

Activity 2 – Internships/Job opportunities (through Knowledge Hub)

Learning and/or general objectives

The Irish BBEC will provide information on internships and job opportunities in the Irish bioeconomy. It will also act as a matchmaking platform for connecting employees to employers. It will bridge the gap between education and industry. MTU will continue to offer work placements and industry/educational institution research collaborations.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Open access as the Irish BBEC will coach and facilitate candidates at all levels.

Skills provided

Necessary skills needed to apply for jobs which could include CV preparation and interview skills or identifying skills gaps and recommendations for further training and upskilling.

Contents (topics)

Platform for matchmaking job opportunities with job seekers.

Teaching methods & Required Staff/Expertise

Click or tap here to enter text.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Social Media

Exploiting of pre-existing tools/learning material

No

Timing (e.g. monthly, half yearly, yearly, etc.)

Real time updates to job seeker market

Assessment methods

No assessment

SECTION 4. Non-learning activities

Activity 1 – Bioeconomy Education and Networking day

General objectives

1. Provide information on Irish bioeconomy.
2. Provide information on Irish BBEC
3. Provide updates on EU-funded projects.
4. Stakeholder engagement.
5. General information to the community.

Description of the activity

Bioeconomy Ireland Week is an annual week-long event held each October to highlight and raise awareness of Ireland's rapidly growing bioeconomy. The celebration is a collaboration of events and awareness raising initiatives involving industry, local communities, producers, researchers and students



throughout Ireland. A broad range of stakeholders from across Ireland's bioeconomy demonstrate and share how individually and collectively the natural environment can be utilised in a sustainable and circular way to help archive a fair and prosperous society for Ireland.

Required Staff/Expertise

Staff working in the Irish bioeconomy sector, an educational leader is required to evaluate the existing educational offers and industry requirements to increase the level of competencies, and to better understand the relevant educational landscape. In addition to this, marketing personnel are required to communicate new biobased stories and to design and implement new web-based hubs offering new educational opportunities.

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): The one-day event will require the same actors who are involved in Bioeconomy Ireland Week including Government departments, research centres, clusters and NGOs.

Exploiting of pre-existing tools/learning material

Click or tap here to enter text.

Timing (e.g. monthly, half yearly, yearly, etc.)

Yearly

Assessment methods

No assessment methods.

Activity 2 – EU Study Visits

General objectives

- Provide information on Irish bioeconomy to other EU countries/regions.
- Provide updates on EU projects.
- Receive information on bioeconomy from other EU countries/regions.

Description of the activity

Organise study visits for Irish bioeconomy stakeholders to other countries to gather information on their bioeconomy and to provide information on Ireland's bioeconomy. Irish stakeholders leverage their network of EU bioeconomy stakeholders from previous/current EU projects.

Required Staff/Expertise

Irish bioeconomy stakeholders and overseas hosts.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): Past study visits have included third-level students, academic staff, public administration, research centres, industry, clusters and NGOs.

Exploiting of pre-existing tools/learning material

Using information from previous study visits, links to project partners in other countries and interterritorial partner meetings. .

Timing (e.g. monthly, half yearly, yearly, etc.)

Half-Yearly

Assessment methods



Prepare a validation questionnaire for all study visits undertaken to access best practice overseas for possible implementation in Ireland, reduce risk of replication and to ensure best possible information sharing for future visits.

BBEC Central Eastern Europe (BBEC CE)

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If "Other" specify: Click or tap here to enter text.

Main Contents (topics - more than one can be choose)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If "Other" specify: Biorefining, nanomaterials, Biotechnology and nanotechnology in the development of new biomedical materials (including biomaterials) and innovative drug forms; basic, preclinical and clinical research in the areas of medical biology and clinical medicine

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Mixed. Some materials will be widely available to be used in activities connected to awareness raising (open access). This also applies to created databases. The created curricula will be dedicated to specific needs reported by entrepreneurs. They will already require an appropriate level of competence.

Language

Mainly English, but some materials will be in national languages (Bulgarian, Czech, Polish)

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

The BBEC CE will become a hub for knowledge exchange, education, cooperation and providing services related to Bioeconomy. This approach enhances the participation and guarantees a substantial interaction between different disciplines in the region and with other BBECs. In order to achieve as many goals as possible a flexible structure is necessary. The structure has to allow flexibility and openness in order to integrate and use the existing potential of a scientific network, business, education partners (members of IRWG and other). The BBEC CE will also include cooperation with other valuable on-going initiatives in EU and/or CEE macro-regional level.

SECTION 2. Learning activities information

Activity 1 – Providing educational materials and expertise to raise awareness

Learning and/or general objectives

The main goal is building awareness about the importance of bioeconomy in the modern world at all levels of education, support to decision-makers in developing and implementing policy in the field of bioeconomy (i.e. Strategies, Road Maps etc.) Supporting companies willing to capitalize on the business potential of the bioeconomy. The activities will also be targeted to promote CBE JU in the macro-region.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Materials will be created for different target groups. They will be open to the public for use by teachers, educators and other knowledge dissemination groups. The materials will also be used during various planned events and conferences dedicated to the bioeconomy in the region.

Skills and abilities provided

The main skills promoted in the materials will show the great importance of system and circular thinking. It is these skills, according to the EU Bioeconomy Strategy, that are extremely important in introducing sustainable change. In addition, data literacy, ethical aspects and



creativity will be promoted. More advanced materials will be created in cooperation with sector experts and will respond to the reported demand from stakeholders, in particular industry.

Contents (topics)

System thinking, Circularity, Ethics, Creativity, Law regulations, Use of data

Advanced topics to be specified.

Teaching methods & Required Staff/Expertise

There will be a number of methods connected to this activity: publications (articles, position papers, scientific publications, etc.), educational materials (videos, brochures, manuals, teaching resources) but also lectures, conferences and other events (workshops, webinars)

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes, but also new materials will be developed.

Timing (e.g. monthly, half yearly, yearly, etc.)

monthly

Assessment methods

-

Activity 2 – Sharing information about valuable education and training opportunities (existing)

Learning and/or general objectives

The main objective is to map valuable bioeconomy education and training providers that will respond to the needs of the industry and other actors in the field of developing skills and learning. The goal is also to improve the quality of education and training providers in the field



of bioeconomy. This activity will also help the industry and other actors to identify educational needs in the right way and address them to education and training providers.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Open access

Skills and abilities provided

This activity is aimed at disseminating the ability to recognize a valuable educational offer and identifying one's own development needs and problems that can be satisfied by training services.

Contents (topics)

This activity will develop a database of education and training providers in bioeconomy which will be continuously updated. Moreover it will be dedicated to create and assessment methodology of the education and training offers and providers. There will be also benchmark activities as for the offers of other European and international bioeconomy educational centres. The important element will also be the promotion of the valuable education offers in the form of training, webinars, lecture, coaching activities(especially BBEC members).

Teaching methods & Required Staff/Expertise

It will be necessary to involve expert external staff who will participate in the creation of the methodology and databases.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: Click or tap here to enter text.

Exploiting of pre-existing tools/learning material

Yes, but also new materials will be developed.

Timing (e.g. monthly, half yearly, yearly, etc.)

monthly

Assessment methods

Assessment methodology will be developed during this activity.

SECTION 3. Experiential and workplace learning activities information

Activity 1 – Supporting cooperation between science and industry

General objectives

The main goal is to enable the development of future staff working in sectors related to bioeconomy. Exchanges between different countries with a higher level of awareness and development of bioeconomy will contribute to expanding the knowledge of students and academic staff which will help to disseminate and develop knowledge in the regions.

Entering requirements

Not yet set.

Description of the activity

The general objectives of this activity will be mapping the regional needs to provide a tailored made educational and training curricula (also non-bio workers: lawyers, IT, engineers etc.), creating data base about exchange programs, international mobility, internships and practices for students and science staff and promote exchange programs, international mobility, internships and practices for students and science staff. Private sector (Industry) will be strongly involve into cooperation with students (job offers, interships, opportunities to write diplom thesis, involvement in projects). It has been also proposed to create a mini-bioeconomy centre with demonstration facilities (biogas plant, composting plant, photovoltaic installation, processing of sludge into biocarbon).

Required Staff/Expertise

Yes. It will be necessary to involve external experts to develop reports on educational needs, tailored made curricula and the Data bases of education and training providers

External actors involved

Yes

No



If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): -
Research institutes - Education and academia - Educators / science communicators -
Student associations, career offices, volunteer centres, - Technology transfer centers,
- Business incubators - Labor market institutions, - Associations of students and
doctoral students

Exploiting of pre-existing tools/learning material

The reports developed during the BIObec project will be useful as a starting point. But it will be necessary to develop new tools and materials. Furthermore training and courses programs already developed by universities (also IRWG BBEC CE) will be used. They will be updated and supplemented with content related to bioeconomy. Curricula will also be created from scratch, for the specific needs of industrial partners.

Timing (e.g. monthly, half yearly, yearly, etc.)

monthly

Assessment methods

-

SECTION 4. Non-learning activities

Activity 1 – Supporting the exchange of knowledge between the stakeholders

General objectives

The main objective is to enable mutual learning and effective communication between BBEC CEEE, other BBEC’s, IRWG and others actors in order to develop capacity of the bioeconomy education and cooperation in the region. The additional result being the joint innovative initiatives in the sphere of bioeconomy education and development.

Description of the activity

This activity will be dedicated to the development of an on-line platform for stakeholders that supports the exchange of knowledge, development of a network of stakeholders (IRWG members, other stakeholders), facilitation of contacts within the network, promotion of interactions, knowledge sharing and mutual learning within the network (regular meetings and workshops, joint events). It will also be dedicated to provide information about upcoming calls (EU and national funds) and to support and facilitate the process of development of project application. It will be also connected to take advantage of already existing initiative (i.e. BIOEASTsUP Thematic Study and SRIA developed by BIOEAST TWG Bioeconomy Education, BIOEAST Uni Net).

Required Staff/Expertise

Project managers, Communication and dissemination experts, consulting experts

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): - Bioeconomy companies (SME, large) - Research institutes - Education and academia - Business development organisations - Public administration - Global national, regional and local political actors - Clusters, Networks and Associations - NGO’s - Private Investors - Start-ups

Exploiting of pre-existing tools/learning material

Yes, communication materials

Timing (e.g. monthly, half yearly, yearly, etc.)

monthly

Assessment methods

-

GERMAN BBEC

SECTION 1. General information

Targeted Educational level(s) ((more than one can be choose)

Vocational

Academic

Lifelong learning

Entrepreneurship training

Other

If “Other” specify: Continuing education

Main Contents (topics - more than one can be chosen)

Primary production systems – agriculture, forestry, aquaculture, including waste and side streams

Food, feed, fibres and bio-based industries

Fuels and bio-energy

Sea, oceans and waters

Other

If “Other” specify: Click or tap here to enter text.

Principal entering requirements (e.g. open access, open access with assessment of personal competencies, restrict access, etc.)

Depending on course. However, we aim to have open access courses unless the regulations of the course development do not allow it. The target group of most of the courses/ activities is students at bachelor and master level and professionals from different areas of the bioeconomy.

Language

German and English

Period of activities

All the year (without Summer schools)

All the year (with Summer schools)

Only winter period

Only summer period (Summer schools)

Add any further general explanations you believe valuable for the BBEC

Click or tap here to enter text.

SECTION 2. Learning activities information

Activity 1 – Course “Projects in Bioeconomic Research - Group Project”

Learning and/or general objectives

The aim of the course is to provide students with real life challenges and that they work in interdisciplinary groups to solve them. This course already exists under the master program Bioeconomy.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Master students of Hohenheim

Skills provided

Students acquire inter- and transdisciplinary skills to analyze biogenic value chains from interrelated agricultural, natural science, engineering as well as social and economic perspectives. Key competencies developed range from independent working and analytical thinking to teamwork, communication and cooperation skills.

Contents (topics)

In this module students have the opportunity to apply the methods and skills learned in the compulsory modules. They perform a system analysis of a whole biogenic value chain from an inter- and transdisciplinary perspective. They gain practical knowledge and skills by applying

the methods of value stream mapping, life-cycle and impact assessment as well as continuous improvement techniques. This enables students to identify gaps and lack of knowledge to be addressed in various disciplines of (bioeconomic) research and development. This allows managing projects independently.

Teaching methods & Required Staff/Expertise

The students will be divided into interdisciplinary groups of 4-6 persons and each group will have a tutor from the academia or from the industry and the groups will work on a presentation and a report on a topic presented by the tutors. The tutors will have some meeting during the semester with the students to guide them.

Learning instruments

- Textbook
- Teacher presentation
- Handouts
- Databases
- Video
- e-platform
- Gaming
- Computer lab
- Learning journey
- Use of laboratories
- Other

If "Other" specify: presentations, group work

Exploiting of pre-existing tools/learning material

Network of the bioeconomy office

Timing (e.g. monthly, half yearly, yearly, etc.)

Once per year

Assessment methods

Presentations and report

Activity 2 – Lecture series: Bioeconomy in practice

Learning and/or general objectives

The aim is to bring closer the industry practice to the academia through a series of lectures in which different companies and startups working on bioeconomy will present what they do and

have conversations with the students about their challenges, barriers, opportunities. This would be a new potential course/ series of lectures to be offered.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Student/ Master students of the university of Hohenheim

Skills and abilities provided

Systems thinking, Connection to the industry, Cross-sectoral thinking, Research, Development and innovation

Contents (topics)

The series of lectures will consist of talks and conversations with representatives of the bioeconomy industry at regional level. Here some examples:

- Disposal and recycling companies
- Insects' production
- Organic farm
- Biobased fibers
- Terrabioponic cultivation methods
- Bioplastics
- Biogas production

These series of lectures could be organized as an additional course or as part of current courses at master level.

Teaching methods & Required Staff/Expertise

There is one person leading and moderating the course from the University of Hohenheim. The main content of the series of lectures will be given by the representatives of the regional industry able to express himself/ herself in English.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

- Gaming
- Computer lab
- Learning journey
- Use of laboratories
- Other

If “Other” specify: Industry presentations

Exploiting of pre-existing tools/learning material

The current network of the Bioeconomy office of Hohenheim

Timing (e.g. monthly, half yearly, yearly, etc.)

Once yearly: around 7 lectures

Assessment methods

Participation in the lectures and online activities.

ECTS: 3. Certification through “portfolio module” or as part of current course

Activity 3 – Bioeconomy and sustainability curriculum for schools

Learning and/or general objectives

The aim is to implement the educational materials for schools designed in the EU Horizon project BioBeo (CSA)

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Students of primary and secondary schools

Skills and abilities provided

Systems thinking, Interconnectedness , Outdoor Learning

Contents (topics)

Students and academics from the university follow the curriculum designed in the project BioBeo with students from primary and secondary school of the region. The curriculum includes different bioeconomy themes:

- Interconnectedness
- Outdoor Learning
- Forestry
- Life Below Water
- The Food Loop

Teaching methods & Required Staff/Expertise

The academics of the university of Hohenheim together with students work together with teachers of primary and secondary schools to follow the curriculum

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: outdoor

Exploiting of pre-existing tools/learning material

BioBeo project results

Timing (e.g. monthly, half yearly, yearly, etc.)

Once yearly

Assessment methods

Part of the primary and secondary school assessment

Activity 4 – Bioeconomy learning modules for agricultural actors

Learning and/or general objectives

The aim is to inform farmers about the bioeconomy as an important solution for sustainable development. This activity also aims to empower and encourage farmers, who are one of the key stakeholders in the biobased economy, through specialist knowledge and the ability to act, to actively help shape the change towards a sustainable and circular bioeconomy, to take it up entrepreneurially and to develop it further.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Farmers of the region

Skills and abilities provided

Systems thinking, Interconnectedness

Contents (topics)

Students have a curriculum including the following topics:

- Introduction to bioeconomy
- Sustainability
- Biobased value webs with practical examples of trendy crops, oil crops and fibers production

Teaching methods & Required Staff/Expertise

Practice-oriented curricula presented by experts in agricultural education and researcher from the university.

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

Video

e-platform

Gaming

Computer lab

Learning journey

Use of laboratories

Other

If "Other" specify: outdoor

Exploiting of pre-existing tools/learning material

BLITZ project results

Timing (e.g. monthly, half yearly, yearly, etc.)

On demand

Assessment methods

No needed

Activity 5 – MOOC: Concepts of sustainable Bioeconomy

Learning and/or general objectives

The aim is to provide fundamental and applied concepts related with the bioeconomy to prospective professionals working in manifold bioeconomy areas. The course, in form of a MOOC (Massive Open Online Course) already exists.

Level of advancement

Beginner/basic

Intermediate

Advanced

Entering requirements

Bachelor and master students, professionals in the biobased industries

Skills and abilities provided

Systems thinking,

Contents (topics)

The course offers a space for reflection on the role of professionals in the bioeconomy. It serves as a baseline to enrich the bioeconomy dialogue integrating different perspectives and dimensions. Given the plurality of bioeconomy perspectives, it is important to acknowledge that there is no one-fits-all definition, and each interpretation is dependent on specific contexts. On this background the course will explain different bioeconomy perspectives and the role of biobased resources as well as biological knowledge for shaping a sustainable bioeconomy:

- Diverse perspectives, conceptual underpinnings and principles of the bioeconomy and its potential to contribute to sustainability.
- Concept of biobased value chain, main characteristics and the multiple sectors that are part of the bioeconomy using examples of renewable resources, conversion technologies and material as well as energetic products.
- Methods to measure the sustainability in the bioeconomy.
- Digitalization for the biological transformation of industry sectors.
- Bioeconomy strategies, stakeholders, innovation and inter- and transdisciplinary approaches.

Teaching methods & Required Staff/Expertise

Teaching staff to engage with students via online in the platform

Learning instruments

Textbook

Teacher presentation

Handouts

Databases

- Video
- e-platform
- Gaming
- Computer lab
- Learning journey
- Use of laboratories
- Other

If "Other" specify: MOOC

Exploiting of pre-existing tools/learning material

ABBEE project

Timing (e.g. monthly, half yearly, yearly, etc.)

Self-paced but if students of the university of Hohenheim want to take this course, it will be offered twice per year in the framework of the EBU label.

Assessment methods

For students of University of Hohenheim: oral exam

SECTION 3. Experiential and workplace learning activities information

Activity 1 – Regional Innovation Partnerships for Promoting Innovations in Bioeconomy

General objectives

The aim of the activity is to promote, build, support and refine cooperation between universities and companies. This offer is based on a current project running at regional level.

Entering requirements

Bachelor and master students of the Universities of Baden-Württemberg

Description of the activity

Students can receive financial support for their project, bachelor's or master's thesis in the field of bioeconomy in cooperation with a company. Companies have the opportunity to give students direct insight with application-oriented processes in the business world, to retain talent and to work on exciting research projects together.

Bachelor and master students of Universities and Universities of Applied Sciences in Baden-Württemberg can apply for connecting financial support in order to put their theoretical knowledge of the bioeconomy to use in the practical environment of companies. Innovation partnerships can take the form of:

- Bachelor and Master theses, project papers
- Internships, during or directly after completing the bachelor and master programme

The potential financial support can cover travel expenses for the student project, rental costs for machines and equipment, work material, personal protective equipment, tools, and consumables, etc.

Required Staff/Expertise

- Professors supervising the thesis
- Administrative person connecting students with industry
- Representatives of the companies

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.):

Companies and startups

Exploiting of pre-existing tools/learning material

Concept of BioPartnerBW

Timing (e.g. monthly, half yearly, yearly, etc.)

Continuously

Assessment methods

Depending. If it is used for a thesis the result of it will be graded after the completion of the work (write the thesis and presentation)

Activity 2 – Additional certificate for master students

General objectives

The aim of the activity is to upgrade and connect existing, disciplinary university curricula on the master level with inter-and trans-disciplinarity, cross-sectoral collaboration, critical thinking, problem solving and sustainability competencies, skills that have been identified as crucial for bioeconomy. This offer is based on a current project running at european level.

Entering requirements

Master students of the EBU (European Bioeconomy University) partners

Description of the activity



The students of master programs embark on a journey with different activities. This Journey starts with an online stage where the students learn different bioeconomy topics and start working in interdisciplinary teams in a challenge to valorize biomass. The highlight of the journey is an onsite meeting, in which students meet to discuss bioeconomy up-to-date concepts and concerns and present in an innovative way the group work results.

This project explicitly promotes and equips the students with an understanding of bioeconomy-related disciplines and their scientific language in addition to the connection with their own disciplinary expertise through online videos prepared by all the six universities bringing different focus areas to the programme such as bioeconomy concepts, biomass production, processing and consumption.

So, the students will be encouraged to develop a T-shaped skills profile consisting of disciplinary expertise and relevant integrative soft skills and knowledge such as sustainability competences, interdisciplinarity, network thinking, intercultural skills, the ability to cooperate, creativity transformative knowledge and problem-solving skills.

Upon graduation, students receive an additional certificate identifying them as European bioeconomy competent professionals who are able, motivated and willing to shape the transformation towards a sustainable bioeconomy.

Required Staff/Expertise

- Professors supervising the group work
- Administrative person organising the content, structure, agenda of the onsite meeting.

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.): For the online part, companies and startups might be invited to give lectures and advise for the group work.

Exploiting of pre-existing tools/learning material

Concept of project EBU label

Timing (e.g. monthly, half yearly, yearly, etc.)

Once each two years

Assessment methods

No

SECTION 4. Non-learning activities

Activity 1 Exhibition on Bioeconomy: Exhibition in Experimenta

General objectives

To spread the knowledge of bioeconomy and demonstrate the implementation of the latest research. This offer does not exist yet but different exhibitions on bioeconomy topics are being prepared and exhibited in the region.

Description of the activity

Exhibition with the following potential topics:

- Priorities of the research (Schwerpunkte des Forschungsprogramms)
- Bio-based raw materials (Biobasierte Rohstoffe)
- Processing (Verarbeitung)
- Products (Produkte)
- Supporting research (Begleitforschung)

The exhibition can be supported by Interactive exhibition of biobased products; an interactive board for understanding processes of biobased products, labs for creating biobased products, and games for understanding the research on bioeconomy and the governance (stakeholders) involved.

Required Staff/Expertise

Experts in science communication from the science center Experimenta and researchers from the University of Hohenheim

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.):

Experimenta, startups and companies from the region

Exploiting of pre-existing tools/learning material

Biobased Box with biobased products and network of the bioeconomy office

Timing (e.g. monthly, half yearly, yearly, etc.)

Once

Assessment methods

None needed

Activity 2 Consultancy for biobased companies

General objectives

To support the implementation of a sustainable bioeconomy through the consultancy services and offer of use of laboratories and experiments for the industry.

Description of the activity

According to the specific needs of the companies in the region, consultancy on bioeconomy-related topics might be offered under certain circumstances. The use of laboratories, the biorefinery technology centre or the implementation of studies could be offered to companies in exchange of a service fee.

Required Staff/Expertise

Researchers of the University of Hohenheim

External actors involved

Yes

No

If "Yes" specify the type of actor (industry, public administration, NGOs, etc.): Industry actors in the region

Exploiting of pre-existing tools/learning material

Depends on the consultancy type

Timing (e.g. monthly, half yearly, yearly, etc.)

On demand

Assessment methods

None needed

Activity 2 Second edition of Biobased textbook

General objectives

To support educational activities through the second edition of the Bioeconomy textbook including the basis of the bioeconomy knowledge and its pillars.

Description of the activity

Development of the second edition of the book with topics such as:

- Bioeconomy context, context and principles
- Biobased production systems and value webs
- Governance and stakeholders in the bioeconomy



- Monitoring and forecasting for the bioeconomy

Required Staff/Expertise

Researchers of the University of Hohenheim

External actors involved

Yes

No

If “Yes” specify the type of actor (industry, public administration, NGOs, etc.):
researchers from EBU and other European institutions

Exploiting of pre-existing tools/learning material

Current edition of the book: <https://link.springer.com/book/10.1007/978-3-319-68152-8>

Timing (e.g. monthly, half yearly, yearly, etc.)

On demand- opn

Assessment methods

None needed