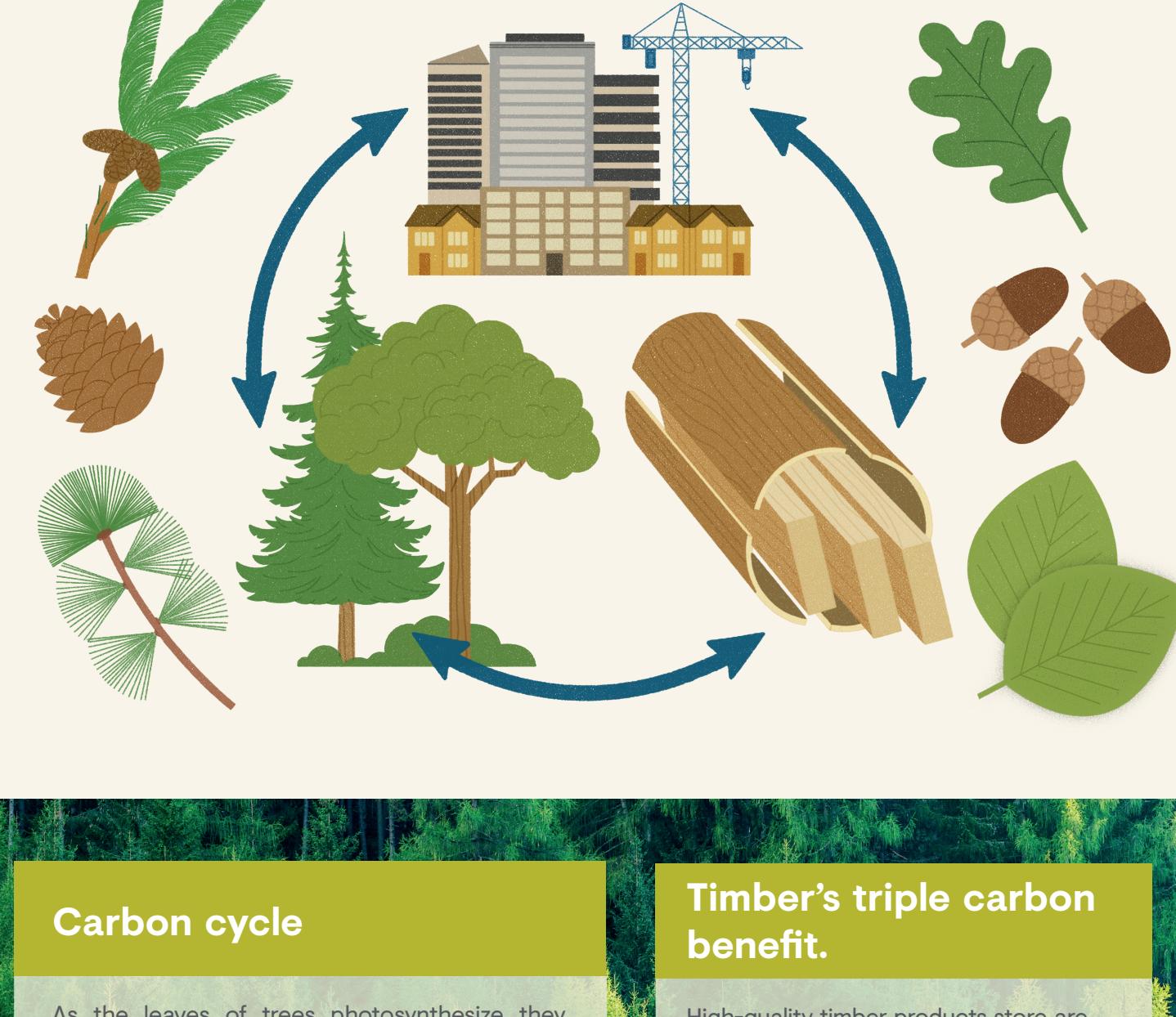


TU838

BSc (Hons)

Sustainable Timber Technology

Timber products have a vital role to play in the emerging sustainable bioeconomy



Importance of forests

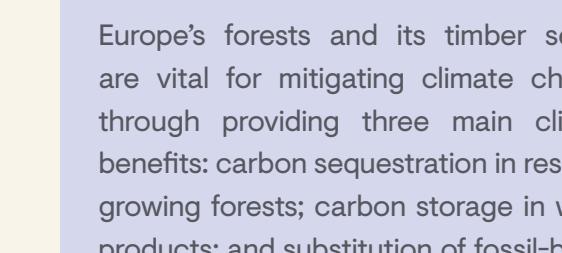
Forests are precious. They play a vital role in our environment, sustaining a great variety of plants and animals, creating oxygen, purifying the air, retaining soil, attenuating water, moderating local climates and slowing global climate change. Forests can also provide us with a location for recreation, all sorts of food, and timber that can be shaped into an endless variety of high-quality timber products. When managed sustainably, forests can be harvested without loss of diversity and environmental benefits.

Carbon cycle

As the leaves of trees photosynthesize they produce hydrocarbons, the building blocks of a tree's growth: as a result forests are a key component of the global carbon cycle. While estimates vary by climate, tree species and age, a hardwood tree can store up to 20 tonnes of carbon dioxide (CO_2) in its lifetime. If trees die and decay, or are cut down and used for fuel, the same amount of CO_2 returns to the atmosphere. This loop may be considered carbon neutral. Far better however, is to turn felled trees into high-quality, long-lasting timber products, which prevent the release of CO_2 for many decades more.

Timber's triple carbon benefit.

High-quality timber products store excellent carbon stores (1 tonne of CO_2 per cubic metre). When designed for greater 'circularity', timber products can be designed and manufactured to support re-use, recycling or disassembly. Crucially timber products can substitute environmentally-damaging materials (like steel, concrete and plastics) providing significant additional environmental benefits.



Climate Action & Decarbonisation

UNESCO stated in 2019 that 'climate change is a real and rapidly-evolving threat for humanity'. It seeks that 'all generations understand the impact of climate change and are better equipped to take action to protect resources, the environment and the planet that sustains life, as enshrined in the UN's Sustainable Development Goals (SDG 13)'. It advocates 'the importance of education as a key element of the response to climate change'

The Irish Government's Climate Action Plan (2019) states that 'the impact of greenhouse gas emissions on climate is accelerating and must be arrested... Decarbonisation is a must if the world is to contain the damage and build resilience in the face of such a profound challenge.'

BSc in Sustainable Timber Technology

TU Dublin has set itself the goal of becoming '**a Powerhouse for Living & Breathing Sustainability**'. BSc (Hons) Sustainable Timber Technology is one of its first programmes to adopt sustainability as a Programme Learning Outcome. By 2023, TU Dublin has committed that all of its programmes will do so.

Two of the learning outcomes of TU838 BSc (Hons) Sustainable Timber Technology state that graduates will be able to:

- Demonstrate a detailed knowledge of the forest products sector in Ireland and abroad, and its role in the emerging bioeconomy;
- Understand sustainability, in particular the increasing role of wood products in sequestering carbon, material substitution and circularity, thereby strengthening societal resilience and mitigating the climate and biodiversity emergencies.

SDGs, the New Green Deal and Bioeconomy

Climate action is at the heart of the European Green Deal (2019), with 25% of the EU budget dedicated to climate action.

Europe's forests and its timber sector are vital for mitigating climate change through providing three main climate benefits: carbon sequestration in resilient, growing forests; carbon storage in wood products; and substitution of fossil-based materials and fuels with a renewable and climate-friendly raw material.



Forest growth, ownership and production

The forests of the European Union (EU) are healthy and are increasing in size. On average, forests cover 42% of European countries. Forests cover as much as 33% of Germany and 77% in Sweden.

Ireland's forest cover has risen from 1.5% in 1908 to 11% in 2017. 18% cover is planned by mid-century. Private owners now own 49% of our forests. The plantations which they have created are responsible for Ireland having one of the fastest rates of afforestation in the EU-27 (2.0% per annum).



Sustainability & ecology in Irish forests

There is a wide variety of trees in Irish forests, but there is no doubt that Sitka Spruce is the most popular species in forests planted in past decades: as a result, it has been called the 'friesian cow' of Irish forestry! There is criticism of the mono-cultural nature of forests planted since the 1950s.

Since 1993, there has been increasing emphasis on biodiversity, environmental resilience, protecting watersheds & forest recreation. As a result, young plantation forests are more biodiverse with broadleaf species accounting for 23% of all afforestation. 'Continuous cover' harvesting also supports biodiversity.

Ireland's forests are an important and expanding sink for carbon, estimated at over 312 million tonnes. Between 2007 & 2016 they removed an average of 3.8 million tonnes of CO_2 equivalent per year from the atmosphere. Ireland's Climate Change Action Plan (2019) proposes increasing this by planting 8,000 hectares of new forest each year. Carbon is sequestered fastest by young trees growing vigorously, but far more carbon is locked up in old trees.

Looking forward, it seems we need to grow two types of forests. Firstly, we need lots of young plantations to make timber products in lieu of products made of concrete, steel & plastic. Secondly, we need lots of biodiverse forests that are allowed to grow old, so that they can sequester increasing amounts of carbon & sustain the most diverse flora & fauna possible.



How we teach science in BSc (Hons) Sustainable Timber Technology

Besides the wide range of modules teaching timber skills, business innovation, production management etc., the programme teaches a range of wood science modules. Learning wood science is deepened by visits to forests, sawmills and joinery workshops, as well as by projects and concepts that are explored across several modules. *Inter alia*, the wood science modules explore:

- How hardwood and softwood trees grow, their cell structures, properties & uses;
- How engineered timber products are made, their properties & uses;
- Forest ecology, the impacts of climate change, sustainable development and environmental legislation;
- Mechanical, structural and thermal properties of wood; and
- Timber in the circular economy, the value of various composite materials, and new areas of innovation.



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