



# WORKING MODEL OF

## National Education Policy -2020

### For Agriculture Education Institutions

To groom the next-gen graduates  
who shall steer technology driven  
agri-economy in India

**SKUAST - KASHMIR**

National Agricultural Higher Education Project

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UNIVERSITY OF AGRICULTURAL SCIENCES  
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## 1. Prelude

The new National Education Policy (NEP) 2020 is establishing a comprehensive framework that seeks to bring sweeping changes to the Indian education system. The new education policy unveiled in 2020 was drafted in line with India's commitment to **Goal 4 (SDG4)** of the 2030 Agenda for Sustainable Development, adopted by India in 2015 that seeks to “**ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**” by 2030. It highlights the importance of continuous learning, upskilling and reskilling for expanding the potential with new skills that can uplift the competency and relevance for the emerging job market. It seeks to build upon 4C's viz., **Critical Thinking, Creativity, Communication and Collaboration** among both faculty and students.

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## Vision of NEP-2020

Create an education system rooted in Indian ethos that contributes directly to transforming India, into an **equitable** and **vibrant knowledge society**, by providing high-quality education to all, and thereby making India a **global knowledge superpower** or **Vishwa Guru**. The vision of the Policy is to develop **knowledge, skills, values, and dispositions** that support **responsible commitment to human rights, sustainable development and living**, and **global well-being**, thereby reflecting a truly global citizen.

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## NEP-2020 VISION ON AGRI. EDUCATION

- i. Recognizing and Promoting unique capabilities of each student
- ii. Flexibility of choosing VOCATIONAL , ACADEMIC, LEADERSHIP and INNOVATION pathways by students
- iii. Multidisciplinary education to ensure integration of all types of knowledge
- iv. Emphasis on conceptual learning than rote learning
- v. Emphasis on inculcating creativity and critical thinking
- vi. Inculcating ethical values, respect for society, culture and nation
- vii. Power of language in learning and life skills
- viii. Priority to formative assessment and discourage summative assessment
- ix. Use of technology in teaching / learning ; on line-off line combo
- x. Promote entrepreneurship, idea generation ,incubation and Business ecosystem

## 2. Introduction

SKUAST-K has been a reform ready institution of higher learning and has always been at the forefront of implementing reforms initiated at national level that has helped it stay relevant as an institution with promise and potential. However, as an institution, SKUAST-K sought to create a holistic reform framework that makes us futuristic. Much before the draft of NEP-2020 was unveiled for public opinion, we used the reform window provided by the ICAR-World bank funded project (NAHEP) to project our vision for higher education that is future oriented, innovative, transformative, inclusive and sustainable. Pertinently our Institutional Development Plan was based on the same futuristic education model that sought to bring exactly the same structural, functional and governance changes as are envisaged in NEP-2020 that marks the reflection of our futuristic vision about higher education projected in our IDP. The vision and its operational framework was a result of a painstaking institutional exercise of a comprehensive SWOT analysis that helped us identify the bottlenecks as are identified in NEP-2020. Our IDP model was drawn on innovative shifts in policy and action that could help us emerge as a socially responsible institution with a mission of creating leaders of tomorrow that can drive technology driven agriculture and shape the transformation of Indian agriculture that is based on innovation, discovery and translational research. Riding on our institutional commitment towards a reformed higher education, SKUAST-K embarked upon an ambitious set of changes in structure, operation and governance around three important pillars of institutional excellence viz., Faculty, Student and Ecosystem. In fact much of our institutional progress in the last two years has been a result of our innovative and futuristic approaches in teaching, research and outreach, with a strong reflection of shaped our education system to be multidisciplinary, choice based and skill directed aimed at developing global citizens as has been envisaged in the NEP-2020. In fact, when NEP-2020 was unveiled we found ourselves in a comfortable stage of operation with many reforms already having taken off in our university with tangible impacts in terms of improved student performance in scholastic endeavors and have submitted our operational frameworks of implementing NEP to the state government.

### 3. Framework of NEP-2020 in Agricultural Education System

The 5th Dean's Committee curriculum for Agricultural and allied sector undergraduate degree programmes and their PG programmes warrants a complete overhauling and rejig as the challenges, priorities and opportunities for Indian Agriculture are different now than what it was a few years back.

New Education Policy -2020 has made it mandatory for all educational institutions to revamp the present educational system in light of the NEP and develop the pedagogy and curriculum in such a way that accommodates high flexibility for the students to tailor their degree programmes in the most convenient way, gives them lots of options to choose the courses as per their needs, choices and professional requirements and stimulate and nurture the individual capabilities and faculties of the students in the best possible manner and enabling ecosystem. While restructuring the education system in light of the NEP-2020, SKUASTK opted for the third option of complete and radical reformation as given in the Implementation Strategy document published by the ICAR. With a new mindset having sought innovative, skill, entrepreneurship and outcome based, quality, internationalized, ITK and IT oriented time tested interventions through our IDP-NAHEP project during the last two and a half years achieving tangible results on the objectives of the Project, majority of which found its parallelism with the objectives of NEP-2020. The working model thus developed is the outcome of two and a half years programme and rigorous implementation under IDP-NAHEP at SKUAST-K.

## 4. KEY FEATURES OF SKUAST-K WORKING MODEL

1. **Concept “Model Education system in Agricultural”** : This is aimed at creating a dynamic and spinning wheel of knowledge that connects Education and Research with the Innovations and Entrepreneurships in agriculture
2. **Ideal attributes of an Agricultural Graduate** : This is aimed to at creating a pool of Next Gen Leaders who shall drive the knowledge based and technology driven agri economy in the country
3. **Foundation programme aimed at building life and social skills**: This program will help students recognize their potentialities, identify purpose, integrate diverse faculties and build linkages.
4. **Mainstreaming of new age sciences as core courses**: Courses complaint with 4th industrial revolution in Agriculture like AI& ML, IoT, Satellite Driven Agriculture, Nanotechnology, Bio-informatics, computational biology
5. **Flexible and Choice based curriculum** to help the students design their own degrees. Students shall have the options to choose from the “*Cafeteria of Courses*” in both online and offline. SKUAST-K has already created an institutional framework for accommodating the recommendations of NEP-2020.
6. **Under-Graduate Degree by Design**: The students shall have the option to design their own curriculum to pursue their own individual interests and creativity, and accrue the skills in some special trade for improving their employability and entrepreneurial potential.
7. **Post Graduate Degree in Sandwich Mode**:
8. **Structured mechanism for multiple entry and exit (MEE)** options with each year comprising of a complete module with defined skill sets: A system that creates modules for multiple exit system that are adequately poised for building core and specialized skills so that the student is sufficiently skilled after exit from the University. SKUAST-K has built the mechanism to seamlessly implement this component of NEP in our setup.
9. **Certificate and Diploma in agriculture** focusing on skills and vocational trainings to empower and enable a student to start his/her venture, entrepreneurship or find a place in Industry: Pave way for a restructured education system with focus on skill development and enhanced employability. Each year is an independent working module by shuffling the 5<sup>th</sup> Dean Committee Courses with addition of choice based vocations and skills related to those vocations.
10. **An Apportioned Student Ready programme** with comparable credit distribution across

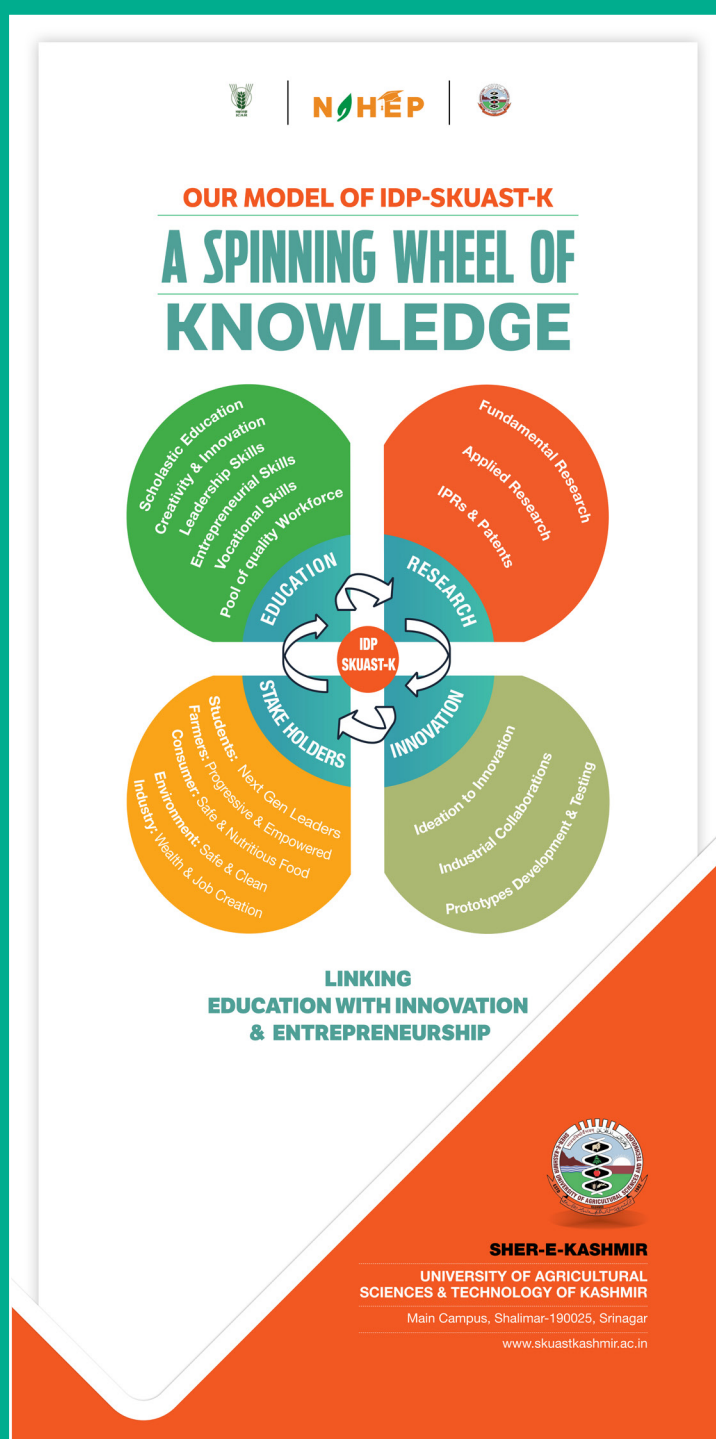


04 years period instead of staked in the 4th year: A system to balance the practice and skill orientation across the whole degree duration and create skill driven modules for early exit and expose all the students uniformly to the Experience Learning (SRP)

- 11. Skill based courses and courses with entrepreneurial potential** to be streamed during 1st and 2nd year of the graduate programmes in place of fundamental type of courses. This arrangement is in contrast to 5th Dean's committee where fundamental and basic courses are mainly placed during the first and second year of the programme. These Courses will be structured through credits apportioned for skill development and entrepreneurship, supported by a credit load of 05 credits in each semester.
- 12. Hard core science based and advanced type of courses** to be aligned during 3rd and the 4th year of the programmes: This is for the students who wish to complete their degree programm with aim of choosing for higher studies/research having aptitude for teaching or research or wish to join extension services or managerial position in industry or his/her own startup or a company.
- 13. Next Gen Transcript:** That reflects the academic and skill portfolio of students by including all mainstream core courses and additional/optional/skill courses..
- 14. A reformed assessment and evaluation system** that promotes cognition and creativity: The system of examination and evaluation will be reformed to make a shift from rote learning based remembering and understanding skills to higher order cognitive skills such as designing, evaluation, critical appraisal.

## 4.1. Model of Agricultural Education in India

The proposed model of education seeks to move beyond the traditional system of teaching and research and connect education and research, with innovation and stakeholders in a dynamic spinning wheel that bridges the disconnect among all the four components. A system of education that is responsive to the aspirations of stakeholders that creates knowledge and wealth through research and innovations.



## 4.2. Key Attributes of our Graduate

Our proposed model of education is expected to create graduates competent in domain subjects, expanding the potential with new skills including social and life skills and leadership attributes and are truly global citizens as envisaged in NEP-2020



- 1. A critical and creative thinker***
- 2. Effective communicator with team-work spirit***
- 3. IT-skilled and information literate***
- 4. Innovative and entrepreneurial***
- 5. Future Leader: agri-business executive, Industry leader and Policy Planner, bio-economist***
- 6. Global citizen with National identity***
- 7. Socially, culturally and environmentally responsible***
- 8. Guided by strong ethical values***

### 4.3. Foundation Programme

**Foundation programme** is a unique 4-week festive-cum-immersion program designed to integrate multiple stream students at the beginning of admission that aims at instilling life skills, identify diverse potentialities and create a platform for students to learn from each other's life experiences. It will comprise of sessions from Alumni, business leaders, outstanding achievers in diverse fields, and people with inspiring life experiences. During the programme the students will also know about the operational framework of academic process in university with reference to NEP-2020, the challenges of being a science student and the opportunities that they can explore in life.

**Foundation Program is aimed to:**

**Aware incoming students** about  
*Vision, Mission, Goals and Ethics*

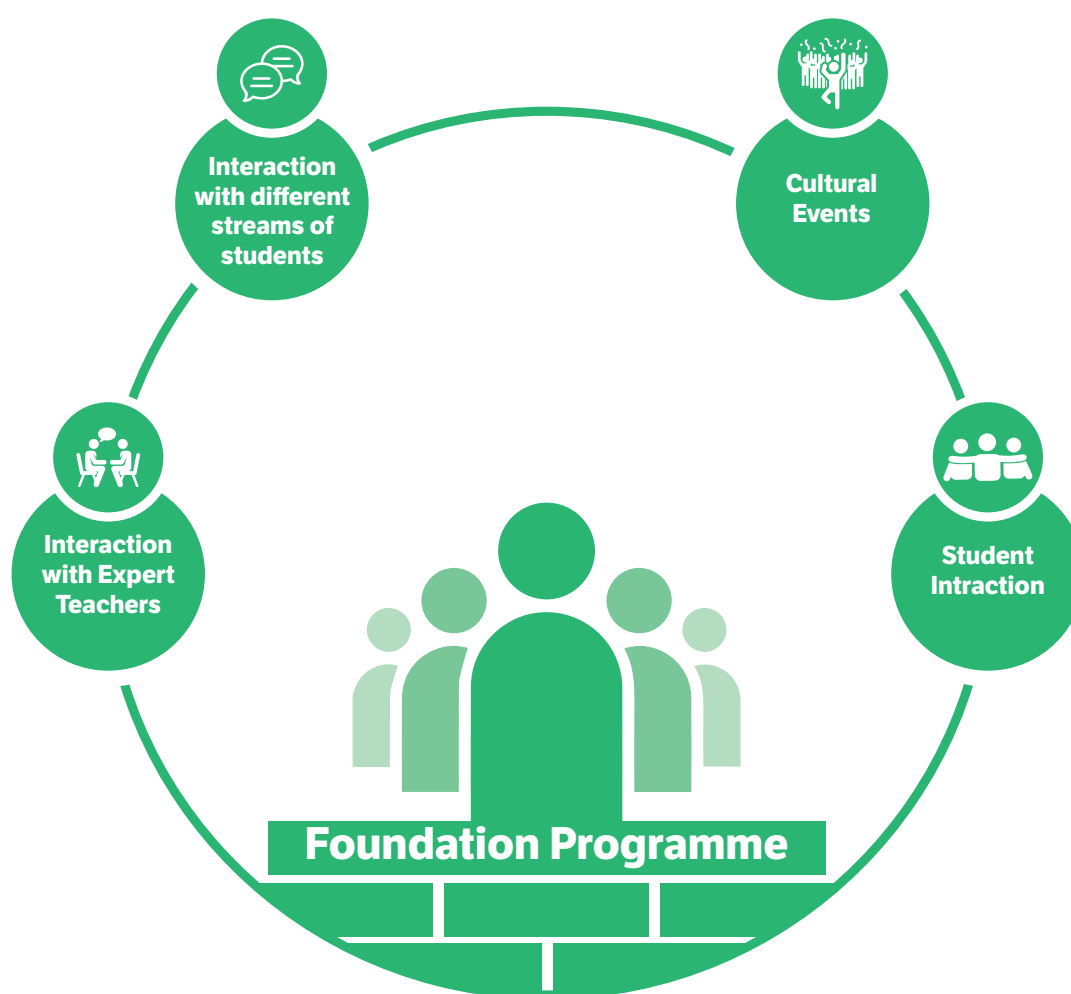
**Develop Life & Social Skills**

- Social Awareness
- Ethics and Values
- Team Work
- Physical Activity
- Leadership

**Invoke students to find answers to:**

- Who I am,
- Where I am?
- What for I am here?

**Make students express their unique attributes**



## 4.4. Restructuring Curriculum

This is aimed to make curriculum Flexible, Choice-based and Inter-disciplinary in order to:

1. Make a 2 week foundation course obligatory in 1st semester to enable students recognize their potentialities, identify purpose in life , integrate diverse faculties and build linkages.
2. Create a window for multiple entry and exit system (MEES)
3. Make Year 1 and Year 2 as Modular and skill based, for award of Certificate and diplomas
4. Apportion 20 credits under EL into 05 credits each in first four semesters as choice based skill module to allow exit with one year certificate and two year diploma .
5. Mainstream new age courses like AI & ML, IoT, Satellite Driven Agriculture, Nanotechnology, Bio-informatics, Computational Biology as core courses ; 03 credits each from 2nd to 7th Semester. Reduce the number of credits under traditional core courses to make way for the new age courses.
6. Apportion 20 credits under RHWE ; 05 credits for deep rural exploration to study Grass Root innovation and life skills; 05 credits for industry externship/institutional/Lab attachment and 10 credits for soft skills, higher order skills, Domain skills, entrepreneurial and innovation skills, creativity and arts through Swayam, MOOCS, Top QS ranked Universities, Organizations and institutes IITs, IIMs, AIIMS, IISc etc.

To achieve this goal, the total credit load of 180 hours during 4 year degree program needs to be redistributed, as under:

S. No	Type of Courses	Total credit hours	
1.	Core Credits of UG degree program	140	including 20 credits for new age courses like AI & ML, IoT, Satellite Driven Agriculture, Nanotechnology, Bio-informatics, computational biology etc.
2.	Choice based skill courses	20	Choice based skill modules
3.	Life skill courses	05	Deep Rural exploration
4.	Industry externship/ Institutional attachment/ Lab attachment	05	--
5.	Cafeteria of soft skills, higher order skills, Domain skills, entrepreneurial and innovation skills, creativity and arts through Swayam, MOOCS, Top QS ranked Universities, Organizations and institutes IITs, IIMs, AIIMS, IISc etc.	10 Minimum	which can be acquired on line any time in the degree Programme. The courses shall be awarded letter grade
<b>Total Credits</b>		<b>180 Credits</b>	

**Note:**

1. *UGC in its latest notification has also indicated to reduce the credit load to 144 hours for a four year degree program, with 36 credit hours each year.*
2. *The selection and distribution of core courses ( 140 Credits) to be decided by the 6th Deans' committee, and the remaining 40 Credits to be designed by the respective universities as per their strengths and the regional needs of the skilled manpower.*
3. *The students leaving the program after completing certificate and diploma can join back the degree programmes. (Procedure For Re-entry and exit defined separately)*
4. *Experiential Learning credits (20) of Student READY Programme are proposed to be apportioned over the first two years, to build skills of students for award of Certificate and Diploma.*
5. *Each student leaving after 1 and 2 years will have an option to do internship for 03-06 months for achieving proficiency in the specific area of his/her interest. Since it is optional the university will need to create the institutional mechanism and guidelines for such an internship programme.*

## 4.5. Concept of Cafeteria of Courses

It is a concept that provides a huge platform of varied type of courses, vocations and skill sets to the students for exercising their option and flexibility as provided in NEP for designing his/her degree programme and skill sets which he/she wishes to hone.

For creating awareness and building confidence among the students to build and strengthen their own individual capabilities, the following SLOGAN is proposed:

**STUDENT SLOGAN**  
**Respecting Individuality and Creativity**

**Curriculum : Flexible, Choice based and Inter-disciplinary**

**DCIDE**

Design your Curriculum for Interdisciplinary Education

**TO**

**LEED**

Leadership, entrepreneurship, employment, discovery

Faculties and colleges will develop a large Cafeteria of Courses to accommodate optional Choice based component comprising of

The Indicative list of Cafeteria courses is given as under:

Course category	Course name
<b>Soft Skills</b>	Communication and Personality development
	Public Speaking and Leadership
	Social and Interpersonal Skills
	Time and resource management
	Problem solving Skills
	Ability to work in Team
	Leadership and Motivation
<b>Higher Order Skills</b>	Elements of Artificial Intelligence (SKUASTK / Uni. Of Helsinki).....
	Machine Learning (IIT Bombay / Stanford Uni. / SKUASTK.....
	Crop Modelling (IARI, N. Delhi).....
	Greenhouse Technology for Food Sustainability (WSU,Aus).....
	Big Data Science in Agriculture
	Soil sensors and GPS
	Precision Agriculture
	RFIDs for monitoring
	Hydroponics and Aeroponics
	Computer Graphics and animation
	Documentary production
	Nanotechnology in agriculture
<b>Business and Entrepreneurship</b>	Business management & Market Intelligence (IIM,Ahmedabad/ SKUASTK)
	Entrepreneurship development & skill building programme(Lemon school of Business, Nagpur).....
	Product development and Branding
<b>Design thinking and Innovative Skills</b>	Design Thinking for Innovations
	Disruptive Innovations
	Creative and critical thinking, innovation skills,
Audit courses	Courses from recognized platforms such as SWAYAM, MOOCs, NPTEL

- In the proposed SKUAST-K model students can earn a minimum of 10 credits leveraging Swayam, MOOCs, NPTEL, COURSERA, UDEMY, Online courses from Top QS ranked Universities, Organizations and institutes IITs, IIMs, AIIMS, IISc etc.
- Students can earn these credits at any stage of the Degree Course and claim credits through ABC. Only those courses accompanied with testimonials ( clearly defining dura-



tion of course) and evaluation report shall be acceptable.

- The courses shall be awarded letter grade Satisfactory ; unsatisfactory.
- Universities should be given the option by the ICAR to formulate their own cafeteria of courses under their IDP

## 4.6. DEGREE BY DESIGN

The focus of the NEP-2020 is about the holistic development of our graduating students which includes “arming them with new-age skills that drive the Agri-4 revolution globally, and can help lay the foundations of a knowledge based and technology driven agri-economy in the country”.

The existing system of agri- education is **uniform and inflexible with a rigid structure** with no choice for the students to harness his / her individual creativity or potential, thereby creating a huge mass of unemployable graduates. The result is that India lags in innovations and tech-based entrepreneurs. Students will create an approved program of study that fulfills their academic and career goals

We propose the “**DEGREE by DESIGN Model**”, in which the student shall complete all the **core courses** required for a degree program in 140 credit hours. The remaining 40 Credits shall be distributed as outlined above.

The **concept empowers** students with a **value-added graduate degree** with **add-on** specialization in a specific sub-sector of his/her interest that he would otherwise acquire after post-graduation. To make this possible some re-distribution of the courses is required. The core courses (common for all) are proposed to be limited to 140 credits. The proposed Scheme of courses is as under:

S. No	Type of Courses	Total credit hours	
1.	Core Credits of UG degree program	140	including 20 credits for new age courses like AI & ML, IoT, Satellite Driven Agriculture, Nanotechnology, Bio-informatics, computational biology etc.
2.	Choice based skill courses	20	Choice based skill modules
3.	Life skill courses	05	Deep Rural exploration
4.	Industry externship/ Institutional attachment/ Lab attachment	05	--
5.	Cafeteria of soft skills, higher order skills, Domain skills, entrepreneurial and innovation skills, creativity and arts through Swayam, MOOCS, Top QS ranked Universities, Organizations and institutes IITs, IIMs, AIIMS, IISc etc.	10 Minimum	which can be acquired on line any time in the degree Programme. The courses shall be awarded letter grade
<b>Total Credits</b>		<b>180 Credits</b>	

## Indicative case examples Designer Degrees

<h3>Horticulture</h3> <ul style="list-style-type: none"> <li><b>BSc Horticulture</b> Commercial Floriculture</li> <li><b>BSc Horticulture</b> (High Tech Nursery management)</li> <li><b>BSc Horticulture</b> (Protected Vegetable Cultivation)</li> <li><b>BSc Horticulture</b> (Precision Farming)</li> <li><b>BSc Horticulture</b> (Exotic Mushroom Cultivation)</li> <li><b>BSc Horticulture</b> (Plant Clinics)</li> <li><b>BSc Horticulture</b> (GIS and RS)</li> <li><b>BSc Horticulture</b> (IoT and Automation)</li> <li><b>BSc Horticulture</b> (Plant Micropropagation)</li> <li><b>BSc Horticulture</b> (Horticulture Produce Processing)</li> </ul>	<h3>Veterinary</h3> <ul style="list-style-type: none"> <li><b>BVSc&amp;AH</b> (Advance Veterinary Diagnostics)</li> <li><b>BVSc&amp;AH</b> (Feed Technology)</li> <li><b>BVSc&amp;AH</b> (Precision Animal Farming)</li> <li><b>BVSc&amp;AH</b> (Poultry Production)</li> <li><b>BVSc&amp;AH</b> (Dairy Production)</li> <li><b>BVSc&amp;AH</b> (Dairy Technology)</li> <li><b>BVSc&amp;AH</b> (Small Ruminant Production)</li> <li><b>BVSc&amp;AH</b> (Animal Products Technology)</li> <li><b>BVSc&amp;AH</b> (Livestock Breeding)</li> <li><b>BVSc&amp;AH</b> (Pet &amp; Companion Animal Practice)</li> <li><b>BVSc&amp;AH</b> (Biological Products)</li> <li><b>BVSc&amp;AH</b> (Veterinary Pharmaceuticals)</li> <li><b>BVSc&amp;AH</b> (Wildlife Management and Medicine)</li> </ul>
<h3>Agriculture</h3> <ul style="list-style-type: none"> <li><b>BSc Agriculture</b> (Seed Production)</li> <li><b>BSc Agriculture</b> (GIS and RS)</li> <li><b>BSc Agriculture</b> (Organic Input production)</li> <li><b>BSc Agriculture</b> (Integrated Farming System)</li> <li><b>BSc Agriculture</b> (Rural Credit Mobilization, Banking &amp; Finance)</li> <li><b>BSc Agriculture</b> (Agro-Forestry)</li> <li><b>BSc Agriculture</b> (Mushroom Cultivation)</li> <li><b>BSc Agriculture</b> (Apiculture)</li> </ul>	<h3>Sericulture</h3> <ul style="list-style-type: none"> <li><b>BSc Sericulture</b> (Hydroponics)</li> <li><b>BSc Sericulture</b> (IFS in Sericulture)</li> <li><b>BSc Sericulture</b> (Seri Mechanisation)</li> <li><b>BSc Sericulture</b> (Computer based fabric designing)</li> <li><b>BSc Sericulture</b> (Chawkie Rearing)</li> </ul>
<h3>Fisheries</h3> <ul style="list-style-type: none"> <li><b>BFSc</b> (Fish Seed Production)</li> <li><b>BFSc</b> (Feed Technology)</li> <li><b>BFSc</b> (Ornamental Fisheries)</li> <li><b>BFSc</b> (Commercial Fisheries)</li> <li><b>BFSc</b> (Fish Products Technology)</li> </ul>	<h3>Forestry</h3> <ul style="list-style-type: none"> <li><b>BSc Forestry</b> (Agro-forestry)</li> <li><b>BSc Forestry</b> (Medicinal Plants)</li> <li><b>BSc Forestry</b> (Wildlife Sciences)</li> <li><b>BSc Forestry</b> (Wood Technology)</li> <li><b>BSc Forestry</b> (GIS and RS)</li> </ul>
<h3>Agricultural Engineering</h3> <ul style="list-style-type: none"> <li><b>B Tech Agri. Engineering</b> (Farm Machinery)</li> <li><b>B Tech Agri. Engineering</b> (Water and Irrigation management)</li> <li><b>B Tech Agri. Engineering</b> (Food Processing Engineering)</li> </ul>	

## 4.7. Certificate & Diploma Programmes

In the restructured academic programme **certificate and diploma programmes** will be carved out by allocating specific skill/trade/vocation based courses in semester I-IV. The module will comprise of **apportioned 05 credit hours** per semester (carved out of **20 EL credits** of student READYprogramme) in each of first four semesters in addition to the core courses. This will also include an optional internship, should a student opt to enhance his/her competence in a specific trade. The admission process will be accordingly modified to provide window for enrollment of certificate and diploma courses. The students thus admitted shall be allowed to re-enter as envisaged in the multiple entry and exit model developed by University.

### Model Structure of Certificate & Diploma programs

Year	Skill category	Course	Credits
1st	Domain specific courses	• Fundamental and skill	30
	General skills (essential for all)	• Introduction to AI & ML • Introduction to Data Science	4 2
	Trade/Vocation specific skills ( Choice bases)	• Skill/Vocational courses	10
<b>Total Credits</b>			<b>46</b>
2 <sup>nd</sup>	Domain specific courses	• Fundamental and skill	30
	General skills (essential for all)	• Introduction to IoT & automation • Introduction to Data analytics • Introduction to Design thinking	2 2 2
	Trade/Vocation specific skills ( Choice bases)	• Skill/Vocational courses	10
<b>Total</b>			<b>46</b>
<b>Grand total</b>			<b>92</b>

## Indicative list of Certificate and Diploma courses

### Horticulture

Commercial Floriculture  
High Tech Nursery management  
Protected Vegetable Cultivation  
Precision Farming  
Exotic Mushroom Cultivation  
Plant Clinics  
GIS and RS  
IoT and Automation  
Plant Micropropagation  
Horticulture Produce Processing

### Veterinary

Advance Veterinary Diagnostics  
Feed Technology  
Precision Animal Farming  
Poultry Production  
Dairy Production  
Dairy Technology  
Small Ruminant Production  
Animal Products Technology  
Livestock Breeding  
Pet & Companion Animal Practice  
Biological Products  
Veterinary Pharmaceuticals  
Wildlife Management and Medicine

### Agriculture

Seed Production  
GIS and RS  
Organic Input production  
Integrated Farming System  
Rural Credit Mobilization, Banking & Finance  
Agro-Forestry  
Mushroom Cultivation  
Apiculture

### Sericulture

Hydroponics  
IFS in Sericulture  
Seri Mechanisation  
Computer based fabric designing  
Chawkie Rearing

### Fisheries

Fish Seed Production  
Feed Technology  
Ornamental Fisheries  
Commercial Fisheries  
Fish Products Technology

### Forestry

Agro-forestry  
Medicinal Plants  
Wildlife Sciences  
Wood Technology  
GIS and RS

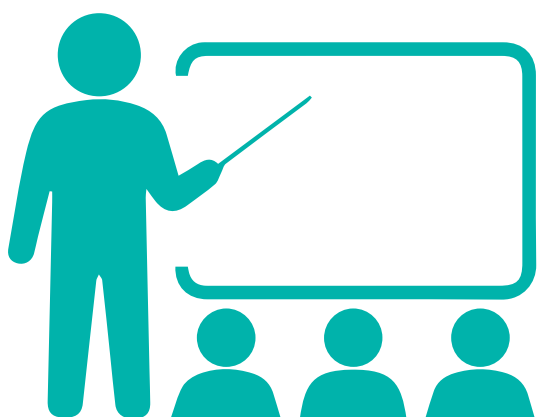
### Agricultural Engineering

Farm Machinery  
Water and Irrigation management  
Food Processing Engineering

## Salient features of new pathway for UG Programme:

- Front load skill based core courses in 1st and 2nd YEAR to ENABLE EXITS for CERTIFICATE and DIPLOMA
- 20 Credits of Experiential Learning distributed in first four semesters as 5 credit Choice Based Skill and Vocational Course modules.
- Design your CERTIFICATES and DIPLOMA ; Choose from a large Cafeteria of Choice Based Skill and Vocational Course modules on offer
- Mainstreaming of courses like Artificial Intelligence, Data Sciences, Block Chain Technology, Internet of things, Higher order Mathematical skills, required to power 4th industrial revolution. ( 24 Credits ) .
- Design Degree Programme : Leverage ABC for credit mobility through a wide array of choices of Courses on soft skills, higher order skills, Business and Entrepreneurial skills, Creativity and Innovation skills through ,SWAYAM, MOOCS, courses from QS ranked Universities, IITs, IIMs, IISc and other top ranked Institutes etc.
- Acquire life skills through deep Deep Rural Exploration ( 05 Credits), Industry Externship/ Institutional attachment (05 Credits), Educational tour ( 01 credit)

## Changing roles



**Teacher**



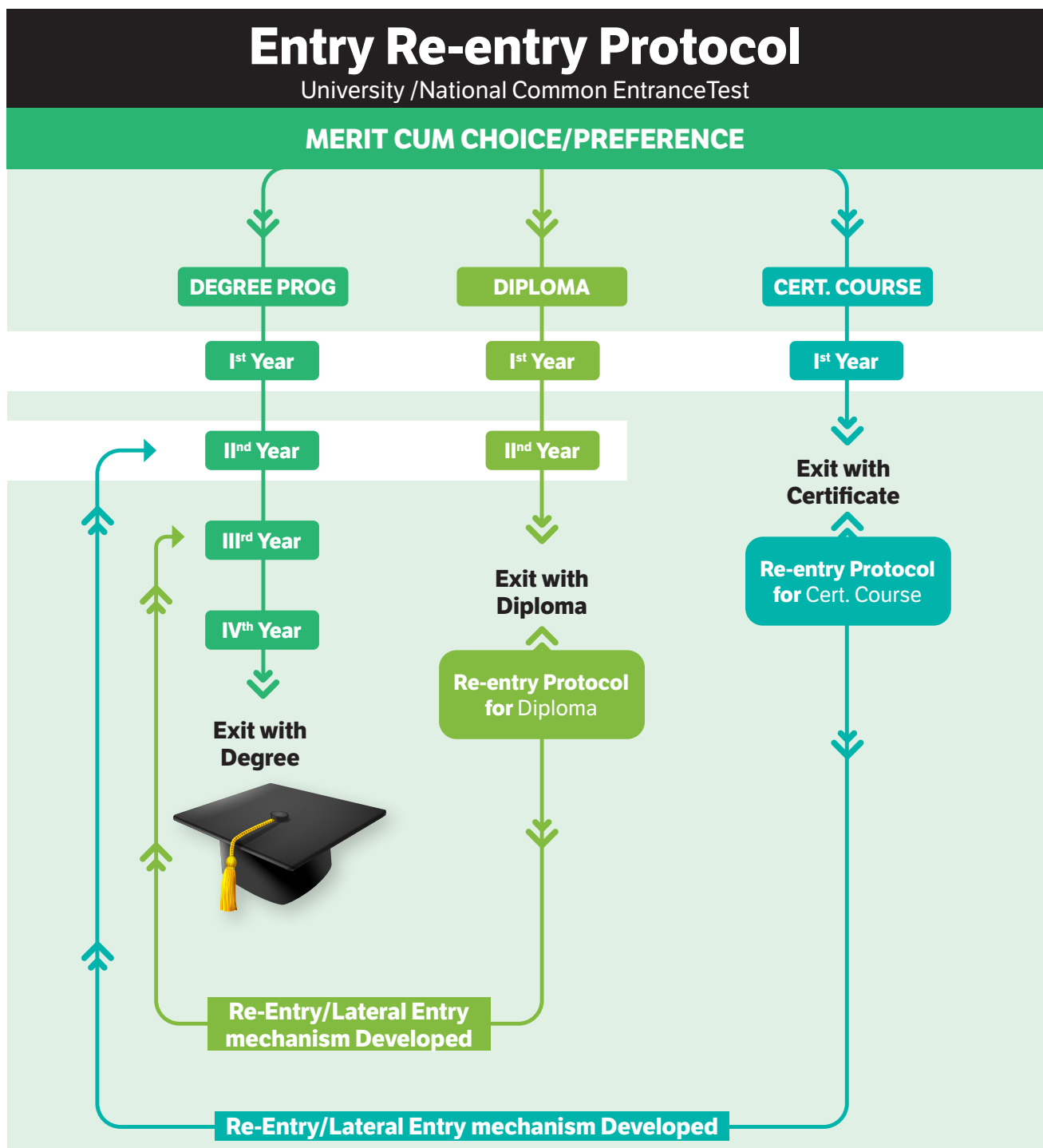
**Mentor**

## Proposed Path way to Certificate, Diploma and Degree Course in Horticulture in alignment with the NEP (2020)

Year	Semester	Core Credits	*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc	**Cafeteria of courses	Life skills like	***Choice Based Skill Course (Modules)	Total	Outcome
1 <sup>st</sup> Year	15 Days Foundation Course							
	I	18			-	05	23	Certificate Course in Horticulture (Module Name)
	II	15	03		-	05	23	Diploma in Horticulture (Module Name)
	III	15	03	10	-	05	23	BSc Hons. (Horticulture )
2 <sup>nd</sup> Year	IV	15	03		-	05	23	
3 <sup>rd</sup> Year	V	20	03		-	-	23	
	VI	20	03		-	-	23	
	VII	20	03		-	-	23	
4 <sup>th</sup> Year	VIII				• Educational Tour (0+1) • Industry Externship/ Institutional attachment (0+5) • Deep Rural Exploration (0+5)		24	
		-	03			-		
Total		120	21	10	11	20	182	
*Mainstreaming of New Age Courses Needed to make students ready for the 4 <sup>th</sup> industrial revolution								
** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, AIIMS, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.								
*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with diploma								

## 4.8. Multiple Entry & Exit System (MEES)

The multiple Entry and exit system as envisaged in NEP 2020 poses an important operational challenge before institutions to ensure a module for certificate and diploma courses that is laden with specific skill sets to address the basic bottleneck of education-skill disconnect identified in NEP-2020. SKUAST-K has developed a model restructured undergraduate programme that is front loaded with skill based programmes and ensures that students exiting at certificate (1 year) and diploma (2 year) programme are adequately skilled to be employable or can create their own entrepreneurship. The restructured model not only addresses core skills but also provides an option to students to choose from a cafeteria of structure skill based courses that can add value to their education at early exit.



The model also contains a framework for lateral/Re-entry for the students that opt to join after a specific time lag.

- i. A student having been selected initially for a degree programme and exits after 01 or 02 years with Certificate or Diploma programme can join back his/her programme through a lateral entry mechanism based on skill, competence and work experience.
  - ii. A student selected for certificate/diploma course can re-enter a degree program any time through a lateral entry mechanism based on skill, competence and work experience.
  - iii. For students admitted to certificate/Diploma programme can re-enter for enrollment to Degree programme after 03-05 years of exit
- During the period after exit student having successfully employed in an industry, private organization or a Govt. Department on the basis of his/her skills sought in Certificate or Diploma programme. (the employment certification will be supported by the bank statement where his monthly salary is being credited)
  - The student has become an entrepreneur or has a registered firm or business unit under LLP, MSME, Partnership firm, or a private limited or a startup and started a business.

## 4.9. Next-Gen Student Transcript ©

This is the working model for the Academic Bank of Credits. Next Gen Student Transcript © is the SKUAST-K's innovative concept reflecting the ultimate outcome of the NEP-2020. It is a comprehensive record of the students' life, **social and technical, innovative and entrepreneurial skills** acquired by him/her in a flexible choice based credit system. It is a **student customized** document containing the breakup of his/her academic achievements in the core subjects prescribed as the minimum requirement for the award of a graduate degree **plus** a record of additional optional (audit) courses undertaken by the student for honing his/her life, social and technical skills required in his/her future endeavours and overall personality development from among the cafeteria of courses under the following broad heads:

- i. **Skill & Vocational courses**
- ii. **Soft Skills** (reflecting social, life, communication, leadership skills);
- iii. **Higher Order Skills** compliant with 4<sup>th</sup> industrial revolution driven by artificial intelligence, machine learning, IoT and robotics, satellite driven agriculture, precision farming, bioinformatics, computational biology etc;
- iv. **Business and Entrepreneurship Skills** to enhance employability in high-paid industry and to groom him/her as an entrepreneur;
- v. **Creativity and Innovation Skills** to unleash his/her potential to provide new solutions to the problems of the society and the industry
- vi. **National / International Internship:**



NGST aims to :

- Cultivate Creativity and Innovation in students
- Skill students in new age technologies
- Churn Industry Ready Graduates
- Make students entrepreneurial
- Boost employability in high paid industry
- Make students as future leader
- Steer the knowledge based and technology driven agri-economy
- Provide the students an opportunity and window for flexibility to choose the subjects and specialization of their interest
- Provide the students facility to enroll for the courses anywhere in India and the globe

**Credits evaluated for OGPA:** The Core Courses of the respective stream of agriculture as prescribed by Deans' committee recommendations / VCI shall be counted towards the OGPA

**Non-credit Audit Courses:** These courses are letter graded, as indicated below. However, they are not counted towards the calculation of the final OGPA.

## Changing roles



**Learner**



**Innovator**

# FOR DEGREE BY DESIGN

**Sher-e-Kashmir**  
**University of Agricultural Sciences & Technology of Kashmir**  
 Faculty of .....  
 Shalimar Campus-190025 www.skuastkashmir.ac.in

## Next Gen Student Transcript

Name:		Programme	
Parentage:		Date of Admission	
Registration No.:		Date of Completion	
<b>Semester</b>	<b>Course No.</b>	<b>Title of course</b>	<b>Credit Hours      Grade obtained      Credit points</b>
<b>A) Academic Core Courses (Total credits 140 )</b>			
1 <sup>st</sup> semester			2+1      0.00      0.00
2 <sup>nd</sup> semester			2+1      0.00      0.00
<b>B) Designer Courses (20 credits)</b>			
2 <sup>nd</sup> semester	SS-		1+1      0.00      0.00
	SS-		2+1      0.00      0.00
<b>C) Interdisciplinary Courses (10 credits)</b>			
3 <sup>th</sup> semester	<b>i) Higher Order Skills</b>		
	HOTS-		2+1      S/G/VG/E      0.00
	HOTS-		2+1      S/G/VG/E      0.00
4 <sup>th</sup> semester	<b>ii) Business and Entrepreneurship</b>		
	BE-		2+1      S/G/VG/E      0.00
	BE-		2+1      S/G/VG/E      0.00
4 <sup>th</sup> semester	<b>iii) Innovative Skills</b>		
	IS-		1+1      S/G/VG/E      0.00
	IS-		1+1      S/G/VG/E      0.00
5 <sup>th</sup> semester	<b>v) Information Technology and Computer Sciences</b>		
	IT-		
	IT-		
<b>D) Leadership Courses (10 credits)</b>			
5 <sup>th</sup> semester	<b>i) Personality Development</b>		
	PD-		1+1      S/G/VG/E      0.00
6 <sup>th</sup> semester	<b>ii) Language Proficiency</b>		
	LP-		1+1      S/G/VG/E      0.00
6 <sup>th</sup> semester	<b>iii) Presentation Skills</b>		
	PS-		1+1      S/G/VG/E      0.00
7 <sup>th</sup> semester	<b>iv) Time/Resource Management</b>		
	TM-		1+1      S/G/VG/E      0.00
<b>E) International/National Externships</b>			
8 <sup>th</sup> semester	IE-		0+10      S/G/VG/E
	Total Credit Hours	0.00	Credit Hours evaluated for OGPA 184      0.00
	Total Credit Points obtained	0.00	Overall Grade Point Average      0.00
Prepared by		Checked	Assistant Registrar      Deputy Registrar
No AU/Acad/PF/ Dated : ,		Registrar	

## INDICATIVE CAFETERIA of OPTIONAL/ AUDIT COURSES- (Min. 20 credits)

### i) Soft Skills ( 0.5-6 credits)

Semester	Code	Course name	Credits	Letter grade	
	SS-111	Communication and Personality development	1+1	S/G/VG/E	
	SS-112	Public Speaking and Leadership	2+1	S/G/VG/E	
	SS-113	Social and Interpersonal Skills	1+1	S/G/VG/E	
		Time and resource management			
		Problem solving Skills			
		Ability to work in Team			
		Leadership and Motivation			

### ii) Higher Order Skills ( 0.5-6 credits)

	HOTS-	Elements of Artificial Intelligence (SKUASTK / Uni. of Helsinki).....	2+1	S/G/VG/E	0.00
		Machine Learning (IIT Bombay / Stanford Uni. / SKUASTK.....		S/G/VG/E	
	HOTS-	Crop Modelling (IARI, N. Delhi).....	2+1	S/G/VG/E	0.00
	HOS-	Greenhouse Technology for Food Sustainability (WSU,Aus).....	1+1	S/G/VG/E	
	HOS	Big Data Science in Agriculture		S/G/VG/E	
	HOS	Soil sensors and GPS		S/G/VG/E	
	HOS	Precision Agriculture		S/G/VG/E	
	HOS	RFIDs for monitoring		S/G/VG/E	
	HOS	Hydroponics and Aeroponics		S/G/VG/E	
	HOS	Computer Graphics and animation		S/G/VG/E	
	HOS	Documentary production		S/G/VG/E	
	HOS	Nanotechnology in agriculture		S/G/VG/E	

### iii) Business and Entrepreneurship ( 0.5-5 credits)

	BE-411	Business management & Market Intelligence (IIM,Ahmedabad/SKUASTK)	2+1	S/G/VG/E	0.00
	BE-312	Entrepreneurship development & skill building programme(Lemon school of Business, Nagpur).....	2+1	S/G/VG/E	0.00
	BE-513	Product development and Branding	2+1	S/G/VG/E	0.00

### iv) Innovative Skills ( 0.5-4 credits)

	IS-111	Design Thinking for Innovations	1+1	S/G/VG/E	0.00
	IS-112	Disruptive Innovations	1+1	S/G/VG/E	0.00

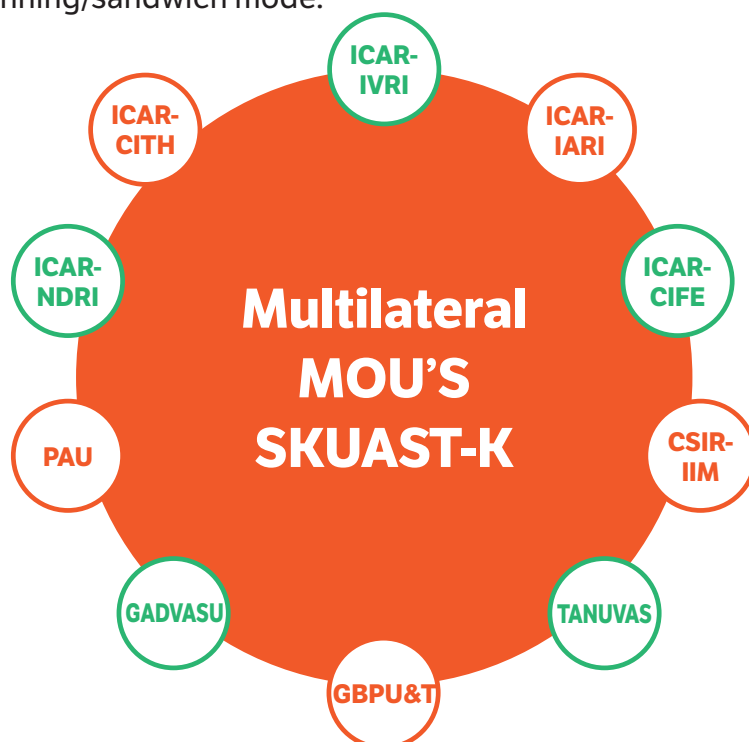
### v) Information Technology and Computer Sciences( 2-4 credits)

vi) International/National Externships (Part of Student READY) KSU USA (3 months)/WSU, Australia/ TNAU,Coimbatore.....			0+10	S/G/VG/E	
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## 4.10. Postgraduate Programs In Sandwich/Twinning Mode

All post graduate programmes will be offered in sandwich mode with master's students to spend 3-6 months and PhD students 6months-1 year of their programme at the identified partner institutions based on subject domain identified. The programs will be designed in a collaborative mode with faculty members from partner institutions as members of the advisory panel.

A consortium of Institutes/Universities needs to be formed who shall come together under a multilateral Memorandum of Agreement to collaborate in running the Post graduate programme in twinning/sandwich mode.



- It is a concept towards improving the quality of education, student research and exposure to other institutions and *in situ* faculty exchange without happening physically where the universities sign an MOU to host the PG students of one another.
- Dual Degrees and Degrees in bilateral mode with the national and international institutions are strongly recommended for consideration by the 6th Deans Committee.

## 4.11. Academic Bank of Credits System (ABC)

1. The purpose of ABC System shall facilitate the mobility of credits across institutions within the country and abroad, done online or in physical mode.
2. For developing a testing model for **ABC** degree programmes, the ICAR/UGC needs to fund the programme in a couple of universities through a project by inviting the proposals in a competitive mode.
3. With the twin objectives of flexibility and quality , ICAR needs to start a portal for students to open their individual accounts for Academic Bank Credits where the students through their parent institutions will upload their courses/credits they successfully complete from any institution in the country or abroad in physical or online mode in part or in full. **All SAUs be advised to mutually open up their doors for such an arrangement**
4. ABC needs to operate on the format of NGST developed by SKUAST Kashmir.

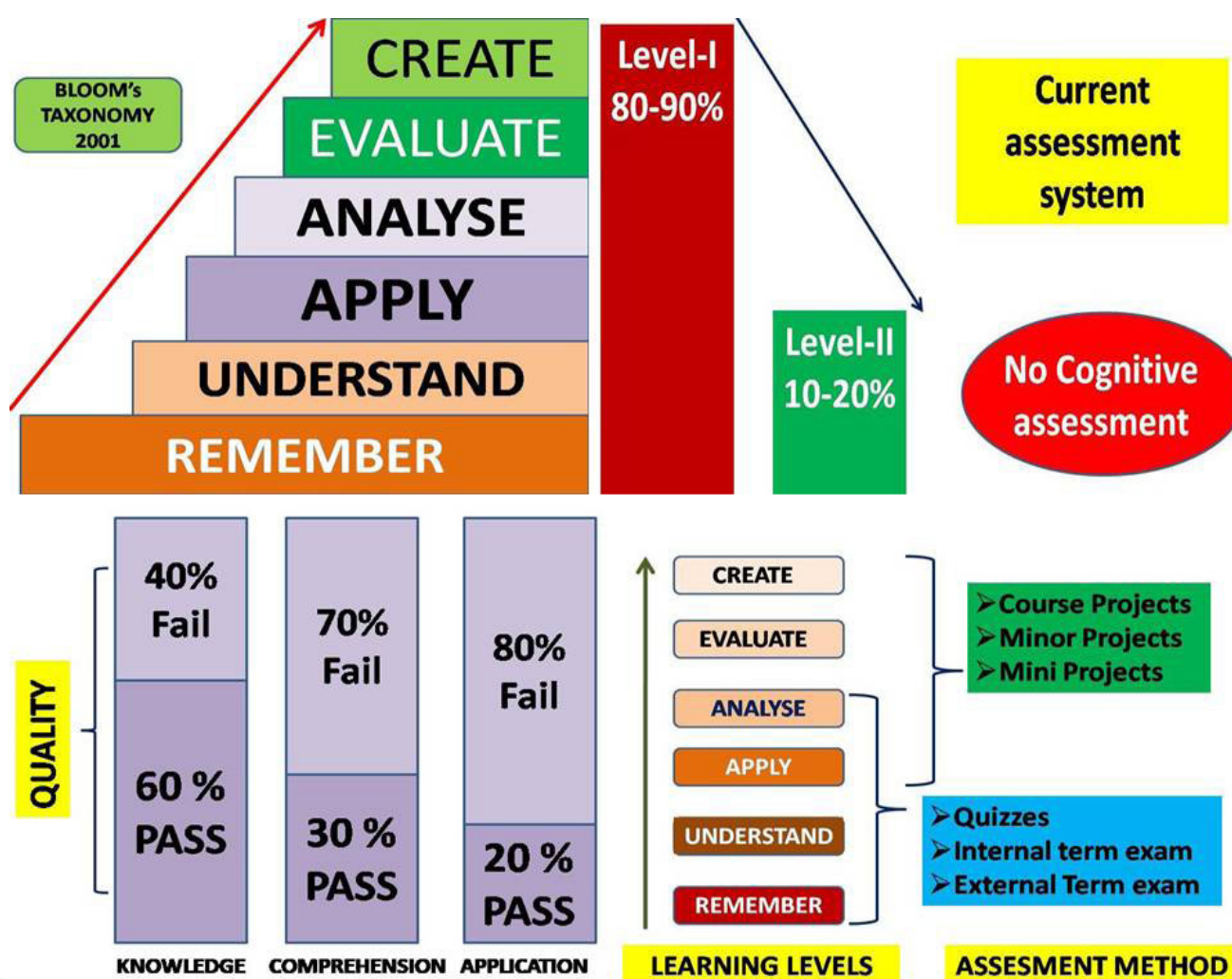
## 4.12. Enabling Ecosystem for Innovation and Entrepreneurship

- a. SAU's across the country have three major mandates of teaching, research and extension. Ideation, Innovation, Entrepreneurship and Startup (IIES) needs to be made the **4th mandate of SAUs** to include IIES in the basket of duties for the teachers.
  - b. Besides domain area courses in agriculture and allied sciences, these cafeteria courses will include courses on higher order skills , viz., artificial intelligence and machine learning, ICT, data science, block chain, IoT, robotics, drone technologies, hydroponics and vertical farming, precision and smart agriculture, nanotechnology, biotechnology, mathematics , entrepreneurship and innovations; product development, branding, digital marketing; design thinking; business development; green marketing; market analytics and intelligence; agri-preneurship ; agro and food processing industries, on soft skills; communication; leadership ;Indian languages, art and culture; History; ITK; Humanities, critical and creative thinking and some advanced basic science be a part of the Cafeteria
1. All SAUs may frame and adopt a policy on Innovation and Start Up in tune with the **National Innovation and Start Up policy, NISP-2019** promulgated by MoE,GOI. SKUAST-K model policy on NISP may be used as a benchmark.
  2. Business Incubator and Special Purpose Vehicles (SPV) need to be established at priority in SAUs through funding from ICAR for incubating innovations into Start Ups

## 4.13. Reforms in assessment and evaluation system

Building cognition and creativity

SKUAST-K seeks to make a paradigm shift in the evaluation and assessment system of students through a series of reforms in evaluation and assessment system for students in line with revised blooms taxonomy to build cognition, creativity and design thinking. This will comprise of changes in evaluation system by introducing various alternative methods such as mini projects, open book system, structured assignments as well as use of rubrics as an evaluation tool. There will be a massive change in question paper setting as well as realigning our curriculum content and delivery methods to be in sync with the new system of evaluation.



LEVEL	REQUIRED SKILL	QUESTION CUES
Remember	<ol style="list-style-type: none"> <li>1. Ability to recall of information like, facts, conventions, definitions, jargon, technical terms, classifications, categories, and criteria</li> <li>2. Ability to recall methodology and procedures, abstractions, principles, and theories in the field knowledge of dates, events, places</li> <li>3. Mastery of subject matter</li> </ol>	List, define, describe, state, recite, recall, identify, show, label, tabulate, quote, name, who, when, where, etc.
Understand	<ol style="list-style-type: none"> <li>1. Understanding information</li> <li>2. Grasp meaning</li> <li>3. Translate knowledge into new context</li> <li>4. Interpret facts, compare, contrast</li> <li>5. Order, group, infer causes</li> <li>6. Predict consequences</li> </ol>	Describe, explain, paraphrase, restate, associate, contrast, summarize, differentiate interpret, discuss
Apply	<ol style="list-style-type: none"> <li>1. Use information</li> <li>2. Use methods, concepts, laws, theories in new situations</li> <li>3. Solve problems using required skills or knowledge</li> <li>4. Demonstrating correct usage of a method or procedure</li> </ol>	Calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, experiment, show, examine, modify
Analyze	<ol style="list-style-type: none"> <li>1. Break down a complex problem into parts.</li> <li>2. Identify the relationships and interaction between the different parts of complex problem</li> </ol>	Classify, outline, break down, categorize, analyse, diagram, illustrate, infer, select
Evaluate	<ol style="list-style-type: none"> <li>1. Compare and discriminate between ideas</li> <li>2. Assess value of theories, presentations</li> <li>3. Make choices based on reasoned argument</li> <li>4. Verify value of evidence</li> <li>5. Recognize subjectivity</li> <li>6. Use of definite criteria for judgments</li> </ol>	Assess, decide, choose, rank, grade, test, measure, defend, recommend, convince, select, judge, support, conclude, argue, justify, compare, summarize, evaluate
Create	<ol style="list-style-type: none"> <li>1. Use old ideas to create new ones</li> <li>2. Combine parts to make (new) whole,</li> <li>3. Generalize from given facts</li> <li>4. Relate knowledge from several areas</li> <li>5. Predict, draw conclusions</li> </ol>	Design, formulate, build, invent, create, compose, generate, derive, modify, develop, integrate

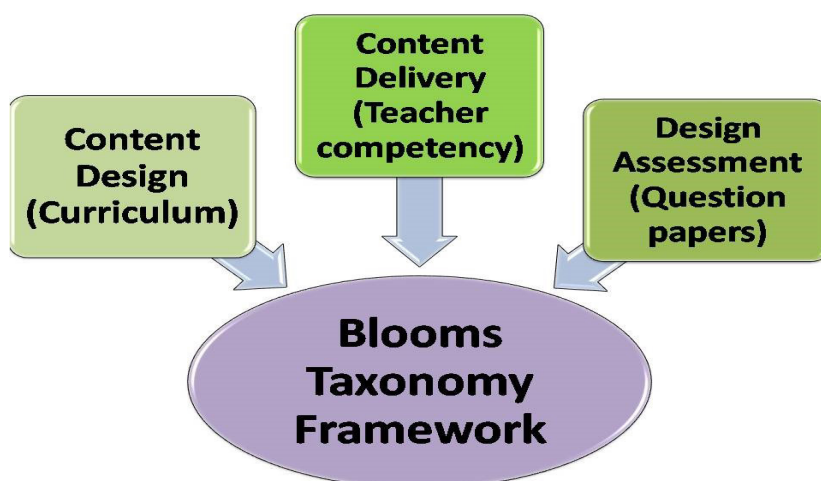


### Traditional Pattern

- Q1: **Discuss** Mendel's laws of inheritance
- Q2: **Differentiate** between complementary and supplementary Gene action
- Q3: **Discuss** early concepts of inheritance
- Q4: **Explain** various types of deviations from Mendelian ratios
- Q5: **Elaborate** various examples of multiple allelism
- Q6: **Write** a short note on Johanssens experiment on beans
- Q7: **Elaborate** three point test cross
- Q8: **What are** various factors affecting crossing over
- Q9: **Differentiate** between Lamphbrush and Polythene chromosome
- Q10: **Write** a detailed account of events that led to discovery of structure of DNA

### Revised Blooms pattern

- Q1: **Compare** various theories of inheritance
- Q2: **Why was** Mendal successful despite the fact that he was not a qualified geneticist
- Q3: **Illustrate** using test cross how genetic constitution of an individual is ascertained
- Q4: **How is** Chi square test used to test the validity of monohybrid and dihybrid cross results
- Q5: **How the** deviations from Mendelian ratios were justified on the basis of number and interaction of genes
- Q6: **Using Human blood group,** explain multiple allelism
- Q7: **How did** East provide the conclusive evidence for multiple factor
- Q8: **Design** a three point test cross using any plant model for mapping gene order and distance
- Q9: **Why are** codingregions rich in AT and non-coding regions rich in GC
- Q10: **How does** the Double stranded structure make DNA as ideal choice of genetic material





## 4.14. Enhancing Faculty Diversity

Diverse Faculty is imperative to infuse new ideas. Two mechanisms are proposed:

- a. **Engagement of Visiting/ Adjunct Faculty:** To bring in faculty diversity a workable model will be the short tenurial appointment of visiting and adjunct professors within and outside country. This will bring the wisdom of globally acclaimed attributes of teaching and mentoring philosophy of such faculty as well as create a diverse teaching and learning environment. Mechanism of visiting and adjunct professors will also foster institutional linkages for larger benefit of student community.

In order to create an institutional mechanism for sustaining such a mechanism, ICAR must create an additional budget line for Visiting/Adjunct Professors within the broader umbrella of ICAR Development Grants.

- b. **Industry Faculty (Professors of Practice)** In case of skill based courses that require greater industry connection, the concept of **Professors of Practice** is proposed as is in vogue in various IIT's and IIM's that have a strong industry connected academic programmes. The **Professors of Practice** will ideally be industry leaders, successful entrepreneurs, especially skilled people that may not have mainstream academic qualifications.

## 4.16. Internationalization of Education in Indian Universities

Swarming international institutions and Attracting International students

SKUASTK needs to take a lead in promoting international training programmes through ecotourism taking advantage of Kashmir's scenic and landscape beauty, Niche crops, Kashmiri cuisines, Kashmir crafts, pashmina and Kani shawls, silken carpets and Kashmiri Culture of great Hospitality and Sufism by establishing an international Centre for learning and training.

## 4.17. Making Faculties Multi-disciplinary

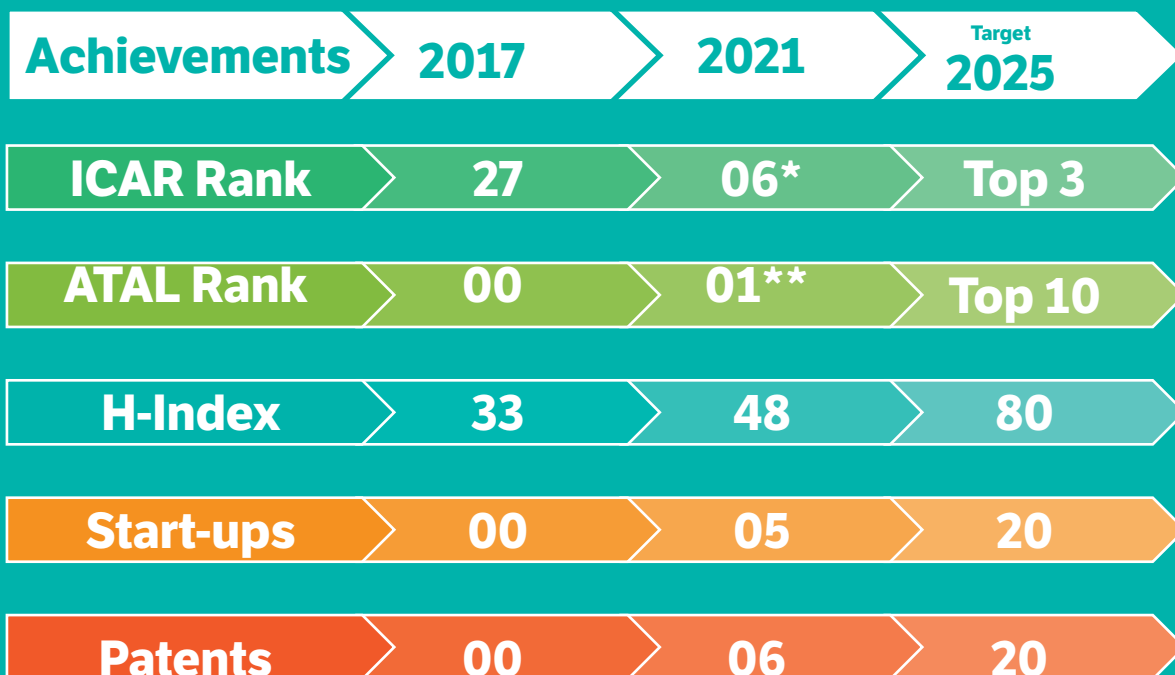
NEP-2020 seeks to make the agri universities multidisciplinary. It recommends including basic sciences, social sciences and humanities and frontier sciences, Indian languages and culture and skill training centres as a part of the agricultural education system. The universities needs to be made State Universities with all the Departments of basic, fundamental, Social Sciences and Humanities, advanced frontier sciences and entrepreneurship and business centres as a part of agricultural universities .This is envisaged to improve the quality of education, research, innovations, entrepreneurship, business , basic and applied aspects of research which can generate wealth, provide solutions to the local problems and contribute to the national economy

- It is a concept towards improving the quality of education, student research and exposure to other institutions and *in situ* faculty exchange without happening physically where the universities sign an MOU to host the PG students of one another.
- Dual Degrees and Degrees in bilateral mode with the national and international institutions are strongly recommended for consideration by the 6th Deans Committee.



## Outcomes of IDP of SKUAST-K under NAHEP

### (a) SKUASTK Journey through IDP-NAHEP



\*Among SAUs | \*\*Band Excellent category

### (b) Education: Working Model of NEP-2020 for SKUASTK

#### (c) Research:

850	Total No. of SCI papers (last 5 years)
60	No. of Faculty with at least 10 SCI papers (last 5 years)
13	SCI Papers per faculty per year (during the last 5 years)
231	PhDs awarded in (last 5 years)
300	Ongoing PhDs

#### (d) Student Seed Grant for Innovation and Entrepreneurship

<b>BIRAC-BIG-2020:</b>	<b>Rs 50 lac</b>	AI based Apple App
<b>BIRAC- PACE-2020</b>	<b>Rs 47 lac</b>	Value addition of Silk worm waste
<b>BIRAC-BIG</b>	<b>Rs 50 lac</b>	Pheromone based traps for IPM
<b>BIRAC-BIG</b>	<b>Rs 50 lac</b>	Phytochemicals for use in Animal Health
<b>BIRAC-BIG</b>	<b>Rs 50 lac</b>	Organic liquid fertiliser from waste hair
<b>RKVY-RAFTAR</b>	<b>Rs 5 lac</b>	Solar Powered Cold Flora

#### (e) Incubation of Business Ideas under NAHEP

- ✓ Daskdán Innovations Pvt Ltd with BIRAC-BIG-2019
- ✓ Automation of Irrigation for HD Orchards
- ✓ Automation of Animal Body weight recording system
- ✓ Agri-EduTech Company
- ✓ Pheromone based Insect Traps
- ✓ iAPS: Intelligent Apple Production System
- ✓ Value addition of Silkworm waste
- ✓ BB & GG Company
- ✓ Shitake Mushroom on Apple and walnut wood waste

#### (f) Faculty and Student Diversity

- ✓ 100 expert lectures from International faculty ( Every 3rd day)
- ✓ 200 expert lectures from National Faculty ( every 2nd day)
- ✓ 1100 National and International Students participated in our online trainings

#### (g) Faculty International Trainings

- ✓ Ross School of Business, USA: 6 leadership progr. for 51 teachers
- ✓ GIMI Isreal 9 Training programs for 115 Teachers
- ✓ WSU Australia 1 training , 12 Teachers
- ✓ AIT Bangkok 1 training , 5 teachers
- ✓ Physical Mode 17 Teachers attended USA, Canada, Turkey
- ✓ Approved for 2021 28 Teachers











# Proposed Model of Education ©

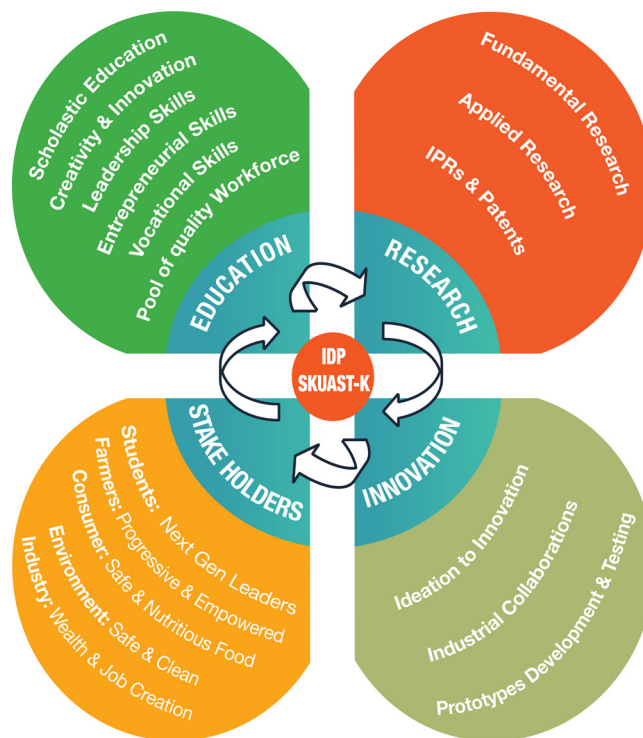


NOHEP



## OUR MODEL OF IDP-SKUAST-K

# A SPINNING WHEEL OF KNOWLEDGE



**LINKING  
EDUCATION WITH INNOVATION  
& ENTREPRENEURSHIP**



**SHER-E-KASHMIR**

**UNIVERSITY OF AGRICULTURAL  
SCIENCES & TECHNOLOGY OF KASHMIR**

Main Campus, Shalimar-190025, Srinagar

[www.skuastkashmir.ac.in](http://www.skuastkashmir.ac.in)

# **Annexure I**



# **Framework for Implementation for New Education Policy 2020**

*Degree by Design for B. Sc Horticulture*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## ***Faculty of Horticulture***

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir  
Shalimar-191 201, Jammu and Kashmir*



## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Horticulture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *	Life skills like Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Horticulture	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
15 Days Foundation Course							
1 <sup>st</sup>	I	15 ( credits )	--	10 Credits		Ornamental nursery production (1+2) Turf and Turf Management ( 0+2)	Certificate Course ( Gardening and Park Management)
	II	15	03			Floristry and Flower Craft (0+2) Preparation of Landscape Design ( 0+3)	
2 <sup>nd</sup>	III	15	03			Protected cutflower Production ( 0+3) Green house automation (0+2)	Diploma ( Commercial Floriculture)
	IV	15	03			Value added flower Products (0+3) Flower seed production (0+2) E- marketing (0+2)	
3 <sup>rd</sup>	V	20	03			-	
	VI	20	03			-	
4 <sup>th</sup>	VII	20	03				
	VIII	-	03			<ul style="list-style-type: none"><li>Educational Tour (0+1)</li><li>Industry Externship/ Institutional attachment (0+5)</li><li>Deep Rural Exploration (0+5)</li></ul>	BSc Horticulture
Total		120	21	10	11	20	-

## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Horticulture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills: business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
15 Days Foundation Course							
1 <sup>st</sup>	I		15 ( credits )	10 Credits		Beekeeping: Honey bee selection, methods of rearing, equipment requirement and their use (1+2) Seasonal management of honey bees (0+2)	Certificate Course in Horticulture/ Agri. (Beekeeping and Honey Production)
	II	15	03		Honey production, extraction, processing, value added products of beekeeping and marketing (1+2) Beekeeping: An alternative option in pollination management (1+1)		
	III	15	03		Floral diversity for different types of honey bees/ products (2+1) Honey authenticity procedures/ testing (0+2)	Diploma in Horticulture/ Agri. (Commercial Beekeeping/ Apiculture)	
2 <sup>nd</sup>	IV	15	03		Queen rearing: Methods and equipment and techniques in equalizing, uniting and dividing of colonies (1+2) Large scale honey production, extraction, value addition, product branding, e-marketing/export (0+2)		
3 <sup>rd</sup>	V	20	03	-		-	
	VI	20	03			-	
4 <sup>th</sup>	VII	20	03				
	VIII	-	03	<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/Institutional attachment (0+5) Deep Rural Exploration (0+5)			BSc Horticulture
Total		120	21	10	11	20	-

## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Horticulture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and Innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
15 Days Foundation Course							
1 <sup>st</sup>	I	15 ( credits )		10 Credits		Drying and Canning of Fruits and Vegetables (1+2) Beverage Technology) (0+2)	Certificate Course in <b>Horticulture</b> (Food Processing)
	II	15	03			Pickling and Fermented Foods (1+2) Snack and Bakery Technology (1+2) Chocolate and confectionary Technology ( 0+2)	
2 <sup>nd</sup>	III	15	03			Post-Harvest Management of Fruits and Vegetables (1+2) Processing of Fruits and Vegetables (1+2)	Diploma in <b>Horticulture</b> (Food Processing and Value Addition)
	IV	15	03			Technology of Cereals, pulses and seeds (1+2) Packaging Technology (0+2) Design and layout of Food Processing Units ( 1+2) E-business management (1+1)	
3 <sup>rd</sup>	V	20	03			-	
	VI	20	03			-	
4 <sup>th</sup>	VII	20	03			<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/ Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)	<b>BSc Horticulture</b>
	VIII	-	03				
Total		120	21	10	11	20	-

## Indicative list of Choice Based Skill and Vocational Courses for Horticulture

S. No	Award	Skill Modules
1,	Certificate Course in Horticulture/ (Mushroom Production Technology)  Diploma in Horticulture/ (Mushroom Production, Processing/ Value Addition and Marketing)	<b>Module-I</b>  Compost/ substrate Production for Different Mushrooms (1+2) Production Technology of Oyster/ Dhingri Mushroom (0+2)  <b>Module –II</b>  Production Technology of White Button Mushroom (1+2) Production Technology of Paddy Straw Mushroom (0+2)  <b>Module –III</b>  Production Technology of Medicinal Mushrooms (1+2) Mushroom Spawn Production Technology (0+2)  <b>Module –IV</b>  Processing for value addition, Packaging and E-marketing of Mushroom Products (1+2) Production Technology of Cordiceps (0+2)
2.	Certificate Course ( Gardening and Park Management)  Diploma ( Commercial Floriculture)	<b>Module-I</b>  Ornamental nursery production (1+2) Turf and Turf Management ( 0+2)  <b>Module –II</b>  Floristry and Flower Craft (0+2) Preparation of Landscape Design ( 0+3)  <b>Module –III</b>  Protected cutflower Production ( 0+3) Green house automation (0+2)  <b>Module-IV</b>  Value added flower Products (0+3) Flower seed production (0+2) E- marketing (0+2)

3.	<p>Certificate Course in Horticulture/ (Biocontrol Production Technology)</p> <p>Diploma in Horticulture/ i(Biocontrol Production Technology and Commercialization)</p>	<p><b>Module-I</b></p> <ul style="list-style-type: none"> <li>• Biological Control Agents: Introduction, Isolations and Characterization (1+2)</li> <li>• Formulations, Application and Storage Methods of Biocontrol Agents (BCA) (0+2)</li> </ul> <p><b>Module –II</b></p> <ul style="list-style-type: none"> <li>• Biocontrol of Insect-pests and using Entomo-pathogenic Biocontrol Agents (1+2)</li> <li>• Production Technology of Tricho-cards and other Insect Parasitic Predators (0+2)</li> </ul> <p><b>Module –III</b></p> <ul style="list-style-type: none"> <li>• Management of Economically Important Diseases of Fruits, Vegetables, Floriculture and Field Crops using BCA (1+2)</li> <li>• Management Economically Important Insect Pests of Fruits, Vegetables, Floriculture and Field Crops using BCA (0+2)</li> </ul> <p><b>Module-IV</b></p> <ul style="list-style-type: none"> <li>• Mass Production and Commercialization of different Biocontrol Agents (0+3)</li> <li>• Packaging, Labelling, Registration and E-marketing of Biocontrol agents/ Bio-stimulants (0+2)</li> </ul>
4.	<p>Certificate Course in Horticulture (Plant Protection Clinics)</p> <p>Diploma in Horticulture/ Agri (Plant Protection and Soil Health Clinics)</p>	<p><b>Module-I</b></p> <ul style="list-style-type: none"> <li>• Detection and Diagnosis of Fungal Diseases of Fruit, Vegetable, Floriculture and Field Crops and Their Integrated Disease Management (1+2)</li> <li>• Diagnosis of Bacterial and Viral Diseases of Fruit, Vegetable, Floriculture and Field Crops and Their Management Strategies (0+2)</li> </ul> <p><b>Module-II</b></p> <ul style="list-style-type: none"> <li>• Diagnosis of Insect Pest of Fruit, Vegetable, Floriculture and Field Crops and Their Integrated Pest Management (1+2)</li> <li>• Biocontrol of Insect Pest of Fruit, Vegetable, Floriculture and Field Crops (0+2)</li> </ul> <p><b>Module-III</b></p> <ul style="list-style-type: none"> <li>• Soil/ Plant sampling, Processing and Elemental Analysis (1+2)</li> <li>• Soil Heath Card Preparation &amp; Crop Based Nutrient Recommendation (0+2)</li> </ul> <p><b>Module-IV</b></p> <ul style="list-style-type: none"> <li>• Nutrient and Weed Management Strategies in Commercial Crop (1+2)</li> <li>• Water Sampling, Processing and Analysis, and Drought Management (0+2)</li> </ul>

5.	<p>Certificate Course in Horticulture/ Agri. (Beekeeping and Honey Production)</p> <p>Diploma in Horticulture/ Agri. (Commercial Beekeeping/ Apiculture)</p>	<p><b>Module-I</b></p> <ul style="list-style-type: none"> <li>• Beekeeping: Honey bee selection, methods of rearing, equipment requirement and their use (1+2)</li> <li>• Seasonal management of honey bees (0+2)</li> </ul> <p><b>Module-II</b></p> <ul style="list-style-type: none"> <li>• Honey production, extraction, processing, value added products of beekeeping and marketing (1+2)</li> <li>• Beekeeping: An alternative option in pollination management (1+1)</li> </ul> <p><b>Module-III</b></p> <ul style="list-style-type: none"> <li>• Floral diversity for different types of honey bees/ products (2+1)</li> <li>• Honey authenticity procedures/ testing (0+2)</li> </ul> <p><b>Module-IV</b></p> <ul style="list-style-type: none"> <li>• Queen rearing: Methods and equipment and techniques in equalizing, uniting and dividing of colonies (1+2)</li> <li>• Large scale honey production, extraction, value addition, product branding, e-marketing/export (0+2)</li> </ul>
6.	<p>Certificate Course in Horticulture (Food Processing)</p> <p>Diploma in in Horticulture (Food Processing and Value Addition)</p>	<p><b>Module-I</b></p> <ul style="list-style-type: none"> <li>• Drying and Canning of Fruits and Vegetables (1+2)</li> <li>• Beverage Technology) (0+2)</li> </ul> <p><b>Module-II</b></p> <ul style="list-style-type: none"> <li>• Pickling and Fermented Foods (1+2)</li> <li>• Snack and Bakery Technology (1+2)</li> <li>• Chocolate and confectionary Technology ( 0+2)</li> </ul> <p><b>Module-III</b></p> <ul style="list-style-type: none"> <li>• Post-Harvest Management of Fruits and Vegetables (1+2)</li> <li>• Processing of Fruits and Vegetables (1+2)</li> </ul> <p><b>Module-IV</b></p> <ul style="list-style-type: none"> <li>• Technology of Cereals, pulses and seeds (1+2)</li> <li>• Packaging Technology (0+2)</li> <li>• Design and layout of Food Processing Units ( 1+2)</li> <li>• E-business management (1+1)</li> </ul>

7	Certificate Course in Horticulture (Commercial Vegetable Production )	<b>Module-I</b> Commercial Vegetable Production (1+2) Protected Cultivation of vegetables ( 1+1)
	Diploma in in Horticulture (Organic Vegetable Production )	<b>Module-II</b> Drying and Canning of Vegetables (1+2) Processing of Vegetables ( 0+2)  <b>Module –III</b>  Organic Vegetable Production Technology Vermi-composting  <b>Module –IV</b>  Certification for Organic produce E-marketing

## Semester Wise Distribution of Courses

### Certificate Course in Horticulture:

#### Semester I (15+3\*+5\*\*=23) Credit Hours including 2 Non-Credit)

S.No.	Course No.	Course Title	Credit
1.	SS-111	Fundamental of Soil Science	2+1
2.	FS-111	Fundamentals of Horticulture	2+1
3.	FLA-111	Ornamental Horticulture	1+1
4.	FS-123	Plant Propagation and Nursery Management	1+1
5.	VS-212	Temperate Vegetable Crops	1+1
6.	FS-214	Temperate Fruit Crops	1+1
7.	ENT-324	Apiculture, Sericulture and Lac culture	1+1
8.	FST-322	Post -Harvest management of Horticulture Crops	2+1
9.		Total Credits	19
10.		Choice Based Skill and Vocational Courses	05
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be mainstreamed as core courses

#### \*\* Choice Based Skill and Vocational Courses for Faculty of Horticulture

##### Semester II (15+3\*+5\*\*=23) Credit Hours including 2 Non-Credit)

1.	VS-121	Tropical and Subtropical Vegetables	2+1
2.	PP-211	Fundamentals of Plant Pathology	2+1
3.	ENT-211	Fundamentals of Entomology	2+1
4.	SS-223	Soil, Water and Plant Analysis	1+1
5.	FLA-212	Commercial Floriculture	2+1
6.	FST-323	Processing of Horticultural Crops	1+2
7.	AGR-312	Agro-meteorology and Climate Change	1+1
8.		Total Credits	19
9.		Choice Based Skill and Vocational Courses	05
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

#### \*\* Choice Based Skill and Vocational Courses for Faculty of Horticulture



## DIPLOMA in Horticulture :

Semester III (15+3\*+5\*\*=23) Credit Hours including 2 Non-Credit)

1	SS-122	Soil Fertility and Nutrient Management	1+1
2	FLA-223	Principles of Landscape Architecture	1+1
4	PP-212	Diseases of Fruit, Plantation, Medicinal and Aromatic Crops	2+1
5	ENT-223	Insect Pests of Fruit, Plantation, Medicinal and Aromatic Crops	2+1
6	VS-224	Precision Farming and Protected Cultivation	2+1
7	VS-315	Organic Farming	2+1
8	VS-328	Seed Production of Vegetable, Tuber and Spice Crops	2+1
9		Total Credits	19
10		Choice Based Skill and Vocational Courses	05
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### \*\* Choice Based Skill and Vocational Courses for Faculty of Horticulture

Semester IV (15+3\*+5\*\*=23) Credit Hours including 2 Non-Credit)

1	PP-313	Diseases of Vegetables, Ornamentals and Spice crops	2+1
2	ENT-325	Insect Pests of Vegetable, Ornamental and Spice Crops	2+1
3	EHB-323	Entrepreneurship Development and Business Management	1+1
4	FS-319	Orchard and Estate Management	1+1
5	AE-121	Water Management in Horticultural Crops	1+1
6	FS-122	Tropical and Subtropical Fruits	2+1
7	FS-215	Weed Management in Horticultural Crops	1+1
8	EHB-312	Horti-Business Management	2+0
9		Total Credits	19
10		Choice Based Skill and Vocational Courses	05
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### \*\* Choice Based Skill and Vocational Courses for Faculty of Horticulture

## B.Sc. (Hons) Horticulture :

Semester V (20+3\*=23 Credit Hours)

1	AS-111	Elementary Statistics and Computer Application	2+1
2	FST-211	Fundamentals of Food and Nutrition	1+1
3	BSH-111	Elementary Plant Biochemistry	2+1
4	BSH-112	Introductory Crop Physiology	1+1
5	BSH-113	Introductory Microbiology	1+1
6	GPB-111	Principles of Genetics and Cytogenetics	2+1
6	E&C-321	Fundamentals of Extension Education	1+1
7	PHE-121	Physical and Health Education	0+1 (NC)
8	AGR-311	Introduction to Major Field Crops	1+1
<b>Total Credits</b>			<b>20</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VI (20+3\*=23 Credit Hours)

1	GPB-122	Principles of Plant Breeding	2+1
2	ENT-212	Nematode Pests of Horticultural Crops and Their Management	1+1
3	VS-317	Potato and Tuber Crops	1+1
4	PB-211	Elementary Plant Biotechnology	1+1
5	VS-223	Spices and Condiments	2+1
6	BSH-124	Growth and Development of Horticultural Crops	1+1
7	FS-226	Plantation Crops	2+1
8	FS-227	Breeding of Fruits and Plantation Crops	2+1
9.	NSS-111	National Service Scheme/National Cadet Corp	0+1 (CNC)
10	BSH-125	Information and Communication Technology	1+1 (NC)
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VII (20+3\*=23 Credit Hours)

1	FLA-325	Breeding and Seed production of Flower and Ornamental plants	2+1
2	EHB-111	Economics and Marketing	2=1
3	FLA-314	Medicinal and Aromatic Crops	2=1
4	FOR-311	Introductory Agro-forestry	1+1
5	VS-316	Breeding of Vegetable, Tuber and Spice crops	2+1
6	BSH-316	Soft Skill Development	0+1 (NC)
7	BSH-317	Communication Skills and Personality Development	0+1
8	EVS-121	Environmental Studies and Disaster Management	2+1
9	AE-222	Farm Power and Machinery	1+1
10	FS-228	Dryland Horticulture	1+1
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VIII (3\*+05+05+10+01=24 Credit Hours)

1		Educational Tour	0+1 (NC)
2		Industry Externship/Institutional attachment	05
3		Deep Rural Exploration	05
4		Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. ( 10 credits)	10
<b>Total Credits</b>			<b>24</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

## **Annexure II**



# Framework for Implementation for New Education Policy 2020

*Degree by Design for B. Sc Agriculture*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## ***Faculty of Agriculture***

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir  
Wadura, Sopore (Baramulla)  
Jammu and Kashmir- 193 201*

## Proposed Path way to Certificate, Diploma and Degree Course in Agriculture in alignment with NEP (2020)

Year	Semester	Core Credits	New age courses like, AI, ML, IOT, Data Sciences, Robotics etc	**Cafeteria of courses on Domain, soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through SWAYAM, MOOCS etc.*	Life skills like	***Choice Based Skill Course (Modules)	Total	Outcome
1 <sup>st</sup> Year	I	18	-	10	-	05	23	Certificate in <b>Agriculture (Module Name)</b>
	II	18	03		-	05	23	
2 <sup>nd</sup> Year	III	15	03		-	05	23	Diploma in <b>Agriculture (Module Name)</b>
	IV	15	03		-	05	23	
3 <sup>rd</sup> Year	V	20	03		-	-	23	<b>B.Sc. Agriculture (Hons)</b>
	VI	20	03		-	-	23	
4 <sup>th</sup> Year	VII	20	03		-	-	23	
	VIII	-	03		<ul style="list-style-type: none"> <li>• Educational Tour (0+1)</li> <li>• Industry Externship/ Institutional attachment (0+5)</li> <li>• Deep Rural Exploration (0+8)</li> </ul>	-	14	
Total		126	21	10 Non-Credit courses (Minimum)	14	20	185	

\*Needed to make students READY for the 4<sup>th</sup> industrial revolution

\*\*Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, AIIMS, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.

\*\*\* Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with diploma

## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Agriculture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
1 <sup>st</sup>	I	Fundamental courses (credits)	18	-		Scientific Beekeeping (1+1) Management of Apiary (1+2)	Certificate in Agriculture ( <b>Commercial Beekeeping</b> )
	II		18	-		Processing of Bee products (1+2) e-Marketing of Bee products ( 1+1)	
2 <sup>nd</sup>	III		15	-		Commercial Crop production-I (1+2) Commercial Nursery production (1+1)	Diploma in Agriculture ( <b>Commercial Agriculture</b> )
	IV		15	-		Commercial Crop production-I ( 1+2) Commercial Nursery production (1+1)	
3 <sup>rd</sup>	V		20	-		-	
	VI		20	-		-	
4 <sup>th</sup>	VII		20	-			
	VIII	-		-	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+8)</li> </ul>		B.Sc. Agriculture ( <b>Hons.</b> )
Total			126	10	14	20	-

## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Agriculture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses (5 Credits each Semester)	Award
1 <sup>st</sup>	I	Fundamental courses (credits)	18	-		Brooding Management (1+1) Hatching Management (1+2)	Certificate Course in Agriculture ( <b>Poultry Production</b> )
	II		18	-		Housing and Feeding Management(1+2) Health & Hygiene of Poultry (1+1)	
2 <sup>nd</sup>	III		15	-		Nursery Production of Fruit Plants (1+2) Nursery Production of ornamentals (1+1)	Diploma in Agriculture ( <b>Commercial Horticulture</b> )
	IV		15	-		Protected cultivation of vegetables (1+2) Production of Cut flowers (1+1)	
3 <sup>rd</sup>	V		20	-		-	
	VI		20	-		-	
4 <sup>th</sup>	VII		20	-			
	VIII	-		-	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+8)</li> </ul>		B.Sc Agriculture ( <b>Hons.</b> )
Total			126		14	20	-



## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Agriculture

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
1 <sup>st</sup>	I	Fundamental courses (credits)	18	-		Bio-pesticides Production (1+1)	Certificate Course in Agriculture ( <b>Organic Inputs Production</b> )
	II	Courses like, AI, ML, IOT, Data Sciences etc	03	-		Bio-agents Production (1+2) Vermicomposting (1+1) Manures & Bio-fertilizers (1+2)	
	III		15	-		Impacts of Chemical farming (2+0)	
2 <sup>nd</sup>	IV		15	-		Principles of Organic Farming (1+2) Resource Application in Organic Farming (2+1) Cropping System & Diversification (1+1)	Diploma in Agriculture ( <b>Organic Production Technology</b> )
	V		20	-		-	
3 <sup>rd</sup>	VI		20	-		-	
4 <sup>th</sup>	VII		20	-			
	VIII		03	-	<ul style="list-style-type: none"> <li>• Educational Tour (0+1)</li> <li>• Industry Externship/ Institutional attachment (0+5)</li> <li>• Deep Rural Exploration (0+8)</li> </ul>		BSc Agriculture ( <b>Hons.</b> )
Total			126	10	14	20	-

**Indicative list of Choice Based Skill and Vocational Courses (Certificate and Diploma) Elective Courses (Degree) and New Age Science for Faculty of Agriculture**

S. No	Name of the Course	Credits
<b>Certificate in Agriculture ( 10 credits)</b>		
1	Organic Inputs Production	(2+3) , (2+3)
2	Agricultural Waste Management	(2+3) , (2+3)
3	Floriculture and Landscaping	(2+3) , (2+3)
4	Commercial Beekeeping	(2+3) , (2+3)
5	Mushroom Cultivation	(2+3) , (2+3)
6	Commercial Sericulture	(2+3) , (2+3)
7	Poultry Production	(2+3) , (2+3)
<b>Diploma in Agriculture (10 credits)</b>		
1	Crop Clinic (Soil, Plant, Water and Seed Testing)	(2+3) , (2+3)
2	Organic Production Technology	(2+3) , (2+3)
3	Commercial Horticulture	(2+3) , (2+3)
4	Food Processing	(2+3) , (2+3)
5	Seed Production Technology	(2+3) , (2+3)
6	Commercial Agriculture	(2+3) , (2+3)
<b>Degree in Agriculture (9 credits)</b>		
1	Agribusiness Management	3 (2+1)
2	Agrochemicals	3 (2+1)
3	Commercial Plant Breeding	3 (2+1)
4	Landscaping	3 (2+1)
5	Food Safety and Standards	3 (2+1)
6	Bio-pesticides and Bio-fertilizers	3 (2+1)
7	Protected Cultivation	3 (2+1)
8	Micro propagation Techniques	3 (2+1)
9	Hi-tech Horticulture	3 (2+1)
10	Weed Management	3 (2+1)
11	System Simulation and Agro-advisory	3 (2+1)
12	Agricultural Journalism	3 (2+1)
<b>New Age Science like, AI, ML, IOT, Data Sciences etc. (15 credits)</b>		
1.	Introductory Data Science and Machine Learning	3 (2+1)
2.	Mathematical Foundation of Data Science and Machine Learning	3 (2+1)
3.	Applications of Data Science in Agriculture	3 (2+1)
4.	Internet of Things (IOT)	3 (2+1)
5.	Automation in Agriculture and Robotics	3 (2+1)

## Semester Wise Distribution of Courses

### Certificate in Agriculture

#### Semester I (18+5\*=23 Credit Hours including 2 Non-Credit)

S.No.	Course No.	Course Title	Credit
<b>Core Courses</b>			
1.		Agricultural Heritage	1 (1+0)
2.		Fundamentals of Agronomy	3 (2+1)
3.		Fundamentals of Horticulture	3 (2+1)
4.		Fundamentals of Plant Pathology	3 (2+1)
5.		Agricultural Microbiology	3 (2+1)
6.		Fundamentals of Entomology	3 (2+1)
7.		Farm practical-I (Kharif Crop)	2 (0+2)
8.		NSS/NCC/Physical Education & Yoga Practices (NC)	2 (0+2)
<b>Choice Based Skill and Vocational Courses*</b>			5 (2+3)
1.		Organic Input Production	
2.		Agricultural Waste Management	
3.		Floriculture and Landscaping	
4.		Commercial Beekeeping	
5.		Mushroom Cultivation	
6.		Commercial Sericulture	
7.		Poultry Production Technology	
<b>Total Credits</b>			<b>23</b>

\*Students have to choose only one Choice Based Skill Course which will be continued to the 2<sup>nd</sup> Semester.

#### Semester II (18+5\*\*=23 Credit Hours including 1 Non-Credit)

S. No.	Course No.	Course Title	Credit
<b>Core Courses</b>			
1.		Introductory Agro-meteorology and Climate Change	3 (2+1)
2.		Fundamentals of Genetics	3 (2+1)
3.		Fundamentals of Crop Physiology	2 (1+1)
4.		Fundamentals of Agricultural Economics	2 (2+0)
5.		Fundamentals of Agricultural Extension Education	2 (1+1)
6.		Comprehension & Communication Skills in English	2 (1+1)
7.		Communication Skill and Personality Development	2 (1+1)
8.		Human Values and Ethics (NC)	1 (1+0)
9.		Farm practical-II (Rabi Crops)	2 (0+2)
<b>Choice Based Skill and Vocational Courses: Continued from the 1<sup>st</sup> Semester</b>			5 (2+3)
<b>Total Credits</b>			<b>23</b>

## Diploma in Agriculture

### Semester III (15+3\*+5\*\*=23) Credit Hours

S. No.	Course No.	Course Title	Credit
<b>Core Courses</b>			
1		Fundamentals of Soil Science	3 (2+1)
2		Problematic Soil and Their Management	1 (1+0)
3		Livestock and Poultry Management	3 (2+1)
4		Principles of Seed Technology	2(2+1)
5		Crop Production Technology I (Kharif Crops)	2 (1+1)
6		Production Technology for Ornamental Crops, MAP and Landscaping	2 (1+1)
7		Production Technology of Vegetables and Spices	2 (1+1)
8		Introductory Data Science and Machine Learning *	3 (2+1)
<b>Choice Based Skill and Vocational Courses**</b>			5 (0+5)
1		Crop Clinic (Soil, Plant, Water and Seed Testing)	
2		Organic Production Technology	
3		Commercial Horticulture	
4		Food Processing	
5		Seed Production Technology	
6		Commercial Agriculture	
<b>Total Credits</b>			<b>23</b>

\*This course will cover the fundamentals of big data, artificial intelligence and machine learning and will be continued up to the 3<sup>rd</sup> Semester. Students will learn how machine learning will be used to handle and interpret big data.

\*\* Students have to choose only one Skill Course which will be continued up to the 4<sup>th</sup> Semester.

### Semester IV (15+3\*+5\*\*=23) Credit Hours

S. No.	Course No.	Course Title	Credit
<b>Core Courses</b>			
1		Fundamentals of Plant Biochemistry & Biotechnology	3 (2+1)
2		Fundamentals of Plant Breeding	3 (2+1)
3		Rural Sociology & Educational Psychology	1 (1+0)
4		Farm Machinery and Power	2 (1+1)
5		Introductory Forestry	2 (1+1)
6		Agri-informatics	2 (1+1)
7		Crop Production Technology I (Rabi Crops)	2 (1+1)
8		Mathematical Foundation of Data Science and Machine Learning*	3 (2+1)
<b>Choice Based Skill and Vocational Courses**</b>			5 (0+5)
<b>Total Credits</b>			<b>23</b>

**B.Sc. (Hons) Agriculture****Semester V (20+3\*=23 Credit Hours)**

S. No.	Course No.	Course Title	Credit
1		Agricultural Finance and Cooperation	3 (2+1)
2		Manures, Fertilizers and Soil Fertility Management	3 (2+1)
3		Pests of Crops and Stored Grain and their Management	3 (2+1)
4		Diseases of Field and Horticultural crops and their Management- I	3 (2+1)
5		Crop Improvement – I (Kharif crops)	2 (1+1)
6		Production Technology for Fruit and Plantation Crops	2 (1+1)
6		Farming Systems and Sustainable Agriculture	1 (1+0)
7		Elective Course	3 (2+1)
8		Applications of Data Science in Agriculture *	3 (2+1)
<b>Total Credits</b>			<b>23</b>

**Semester-VI (20+3\*=23 Credit Hours)**

1		Agricultural Marketing, Trade and Prices	3 (2+1)
2		Crop Improvement – II (Rabi crops)	2 (1+1)
3		Renewable Energy and Green Technology	2 (1+1)
4		Diseases of Field and Horticultural crops and their Management- II	3 (2+1)
5		Statistical Methods	2 (1+1)
6		Principles of Integrated Pests and Diseases Management	3 (2+1)
7		Geo-informatics and Nano-technology and Precision Farming	2 (1+1)
8		Elective Course	3 (2+1)
9.		Internet of Things (IOT)*	3 (2+1)
<b>Total Credits</b>			<b>23</b>

**Semester-VII (20+3\*=23 Credit Hours)**

1		Rainfed Agriculture & Watershed Management	2 (1+1)
2		Protected Cultivation and Secondary Agriculture	2 (1+1)
3		Environmental Studies and Disaster Management	2 (1+1)
4		Entrepreneurship Development and Business Communication	2 (1+1)
5		Post-harvest Management and Value addition of Fruits and Vegetables	2 (1+1)
6		Management of Beneficial Insects	2 (1+1)
7		Principles of Organic Farming	2 (1+1)
8		Principles of Food Science and Nutrition	1 (1+0)
9		Farm Management, Production and Resource Economics	2 (1+1)
Elective Course 10.			3 (2+1)
11		Automation in Agriculture and Robotics *	3 (2+1)
<b>Total Credits</b>			<b>23</b>

**Semester-VIII (01+05+08+10 =24 Credit Hours)**

1		Educational Tour (NC)	0+1
2		Industry Externship/Institutional attachment	05
3		Deep Rural Exploration	08
4		Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through SWAYAM, MOOCS etc.	10
<b>Total Credits</b>			<b>24</b>

## **Annexure III**



# Framework for Implementation for New Education Policy 2020

*Degree by Design for B. Sc Forestry*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## ***Faculty of Forestry***

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir  
Benhama Ganderbal-191 201  
Jammu and Kashmir*



## Proposed Path way to Certificate, Diploma and Degree Course in Forestry in alignment with the NEP (2020)

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18		-		05	26	Certificate Course in
	II	17	03	-		05	25	<b>Forestry (Module Name)</b>
2 <sup>nd</sup> Year	III	16	03	-		05	24	Diploma in
	IV	20	03	-		05	28	<b>Forestry (Module Name)</b>
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
4 <sup>th</sup> Year	VII	20	03	-		-	23	
	VIII	13	03	-	<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)	-	26	<b>BSc Forestry (Choice Based Modules)</b>
Total		<b>143</b>	<b>21</b>	<b>10</b>		<b>20</b>	<b>197</b>	
<p>*Needed to make students ready for the 4<sup>th</sup> industrial revolution</p> <p>** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.</p> <p>*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with</p>								

## Pathways to Certificate, Diploma and Degree Programme Case Example 1 from Faculty of Forestry

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18	-	-		05	26	Certificate Course in <b>Forestry (Plantation technology and Nursery Management)</b>
	II	17	03	-		05	25	
2 <sup>nd</sup> Year	III	16	03	-		05	24	Diploma in <b>Forestry (Entrepreneurship in Agroforestry and Wild Fruits)</b>
	IV	20	03	-		05	28	
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
4 <sup>th</sup> Year	VII	20	03	-		-	23	<b>BSc Forestry (Silviculture and Agroforestry)</b>
	VIII	13	03	-	<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/ Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)	-	26	
Total		<b>143</b>	<b>21</b>	<b>10</b>		<b>20</b>	<b>197</b>	

	<p>*Needed to make students ready for the 4<sup>th</sup> industrial revolution</p> <p>** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.</p> <p>*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with</p>
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## Pathways to Certificate, Diploma and Degree Programme Case Example 2 from Faculty of Forestry

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through, SWAYAM, MOOCS etc. *)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18		-		05	26	Certificate Course in
	II	17	03	-		05	25	Forestry (Nursery practices of medicinal and aromatic plants)
	III	16	03	-		05	24	Diploma in Forestry
2 <sup>nd</sup> Year	IV	20	03	-		05	28	(Processing, Value addition and entrepreneurship in herbal sector)
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
	VII	20	03	-		-	23	
4 <sup>th</sup> Year	VIII	13	03	-	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+5)</li> </ul>	-	26	BSc Forestry (Forest Products and Utilization)
Total		143	21	10		20	197	

\*Needed to make students ready for the 4<sup>th</sup> industrial revolution

\*\* Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.

\*\*\* Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with

## Pathways to Certificate, Diploma and Degree Programme Case Example 3 from Faculty of Forestry

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18	-	-		05	26	Certificate Course in Forestry (Business development in Forest Based Industries)
	II	17	03	-		05	25	
2 <sup>nd</sup> Year	III	16	03	-		05	24	Diploma in Forestry (Forest Business Management)
	IV	20	03	-		05	28	
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
4 <sup>th</sup> Year	VII	20	03	-		-	23	BSc Forestry (Forest Resource Management)
	VIII	13	03	-	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+5)</li> </ul>	-	26	
Total		143	21	10		20	197	

\*Needed to make students ready for the 4<sup>th</sup> industrial revolution

\*\* Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.

\*\*\* Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with

## Pathways to Certificate, Diploma and Degree Programme Case Example 4 from Faculty of Forestry

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18	-	-		05	26	Certificate Course in Forestry (Production of quality planting material)
	II	17	03	-		05	25	
2 <sup>nd</sup> Year	III	16	03	-		05	24	Diploma in Forestry (Business of quality planting material)
	IV	20	03	-		05	28	
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
	VII	20	03	-		-	23	BSc Forestry (Forest Biology and Tree Improvement)
4 <sup>th</sup> Year	VIII	13	03	-	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+5)</li> </ul>	-	26	
Total		<b>143</b>	<b>21</b>	<b>10</b>		<b>20</b>	<b>197</b>	

\*Needed to make students ready for the 4<sup>th</sup> industrial revolution

\*\* Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.

\*\*\* Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with

## Pathways to Certificate, Diploma and Degree Programme Case Example 5 from Faculty of Forestry

Year	Semester	Core Credits	Basic Skill course (*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc)	(** Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. *)	Life Skills	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 DAYS FOUNDATION COURSE</b>								
1 <sup>st</sup> Year	I	18	-	-		05	26	Certificate Course in <b>Forestry (Wildlife Photography)</b>
	II	17	03	-		05	25	<b>Forestry (Wildlife Photography)</b>
2 <sup>nd</sup> Year	III	16	03	-		05	24	Diploma in <b>Forestry (Ecotourism)</b>
	IV	20	03	-		05	28	<b>Forestry (Ecotourism)</b>
3 <sup>rd</sup> Year	V	19	03	-		-	22	
	VI	20	03	-		-	23	
4 <sup>th</sup> Year	VII	20	03	-		-	23	
	VIII	13	03	-	<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/ Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)	-	26	<b>BSc Forestry (Wildlife Sciences)</b>
Total		<b>143</b>	<b>21</b>	<b>10</b>		<b>20</b>	<b>197</b>	
<p>*Needed to make students ready for the 4<sup>th</sup> industrial revolution</p> <p>** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.</p> <p>*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with</p>								

## Indicative List/Cafeteria of Choice Based Skill Course (CBSC) Modules in Forestry

S. No. & Division	Award	Skill Modules
1. Silviculture and Agroforestry	Certificate Course in <b>Forestry (Plantation technology and Nursery Management)</b>	<b>Module 1</b> <b>Plantation technology and Nursery Management (SAF)</b> - Multipurpose tree species (1+1) - QPM of conifers (1+2)
	Diploma in <b>Forestry (Entrepreneurship in Agroforestry and Wild Fruits)</b>	<b>Module 2</b> <b>Entrepreneurship in Agroforestry and Wild Fruits (SAF)</b> - Agroforestry and for sustainability (1+2) - Value addition of wild edible fruits for entrepreneurship (1+1)
2. Forest Products and Utilization	Certificate Course in <b>Forestry (Nursery practices of medicinal and aromatic plants)</b>	<b>Module 3</b> <b>Nursery practices of medicinal and aromatic plants (FPU)</b> - Medicinal plants propagation (1+2) - Aromatic plants propagation (1+1)
	Diploma in <b>Forestry (Processing, Value addition and entrepreneurship in herbal sector)</b>	<b>Module 4</b> <b>Processing, Value addition and entrepreneurship in herbal sector (FPU)</b> - Entrepreneurship in herbal sector (1+2) - Processing and Value addition of Forest Foods (1+1)
3. Forest Resource Management	Certificate Course in <b>Forestry (Business development in Forest Based Industries)</b>	<b>Module 5</b> <b>Business development in Forest Based Industries (FRM)</b> - Commercialization, Value Chain Innovations (1+2) - Bio-economy of Forest Resources (1+1)
	Diploma in <b>Forestry (Forest Business Management)</b>	<b>Module 6</b> <b>Forest Business Management (FRM)</b> - An overview of Forest based industries (FRM) (1+1) - Supply chain management (Forest Based Industry) (1+2)
4. Forest Biology and Tree Improvement	Certificate Course in <b>Forestry (Production of quality planting material)</b>	<b>Module 7</b> <b>Production of quality planting material (FBT)</b> - Nursery establishment of cotton free Poplars (1+2) - Nursery establishment of Willows (1+1)
	Diploma in <b>Forestry (Business of quality planting material)</b>	<b>Module 8</b> <b>Business of quality planting material (FBT)</b> - Business of Planting Botanicals (1+2) - Business of Aesthetic plants (1+1)
5. Wildlife Sciences	Certificate Course in <b>Forestry (Wildlife Photography)</b>	<b>Module 9</b> <b>Wildlife Photography (WLS)</b> - Fundamentals of Wildlife photography (1+2) - Entrepreneurship in (1+1)
	Diploma in <b>Forestry (Ecotourism)</b>	<b>Module 10</b> <b>Ecotourism (WLS)</b> - Ecotourism and wildlife (1+1) - Entrepreneurship development in Ecotourism (1+2)

## Semester Wise Distribution of Courses



**Certificate Course in Forestry:**  
**Semester I (23 credits)**

S. No.	Catalog	Course	Credit
1.	SAF 1101	Introduction to Forestry	2+0
2.	SAF 1102	Dendrology	1+1
3.	NRM 1101	Introduction to Agronomy and Horticulture	1+1
4.	NRM 1102	Geology & Soils	1+1
5.	SBS 1101	Information and Communication Technology	1+1
6.	SBS 1102	Communication Skills and Personality Development	1+1
7.	FBT 2204	Seed Technology	1+1
8.	FBT 2205	Nursery Management	1+1
9.	SBS 1106	Physical Education-I	0+1*
10.	SBS 1107	NCC-I/NSS-1	0+1*
11.	CBSVC	Choice based skill and vocational courses	5 credits
		<b>TOTAL</b>	<b>23</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

**Semester II (22)**

S. No.	Catalog	Course	Credit
1.	FBT- 1201	Tree Physiology	1+1
2.	FB T1202	Plant Cytology and Genetics	1+1
3.	SAF 1203	Theory and Practice of Silviculture	1+1
4.	SAF.3209	Plantation Forestry	1+1
5.	NRM.3211	Forest Laws, Legislation and Policies	1+0
6.	WLS 1201	Wildlife Biology	1+1
7.	NRM 1203	Forest Protection	1+1
8.	SAF 2106	Forest Mensuration	1+1
9.	SBS 1209	Physical Education-II	0+1*
10.	SBS 1210	NCC-II/NSS-II	0+1*
11.	CBSVC	Choice based skill and vocational courses	5 credits
		<b>TOTAL</b>	<b>22</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

**DIPLOMA in Forestry:**  
**Semester III (21)**

S. No.	Catalog	Course	Credit
1	NRM.2104	Environmental Studies and Disaster Management	1+1
2	NRM.2105	Forest Survey & Engineering	1+1
4	NRM 2106	Soil Biology and Fertility	1+1
5	NRM2107	Forest Ecology & Biodiversity	1+1
6	FBT 2103	Tree Improvement	1+1
7	SAF 2105	Principles of Agroforestry	1+1

8	FPU 2101	Wood Anatomy	1+1
9	SBS 2111	Physical Education-III	0+1*
10	SBS 2112	NCC-III/NSS-III	0+1*
11.	CBSVC	Choice based skill and vocational courses	5 credits
<b>Total</b>			<b>21</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

#### **Semester IV (25 credits)**

S. No.	Catalog	Course	Credit
1	NRM 2208	Forest Management	1+1
2	SAF 2207	Silviculture of Indian Trees	1+1
3	FPU 2202	Wood Products and utilization	1+1
4	FPU 2203	Ethnobotany,	1+1
5	FPU 2204	Medicinal and Aromatic Plants	1+1
6	WLS 2202	Ornithology & Herpetology	1+1
7	SBS 1103	Plant Biochemistry	1+1
8	SBS 1104	Introductory Plant Physiology	1+1
9	NRM 2209	Rangeland and Livestock Management	1+1
10	SBS 2213	Forest Tribology & Anthropology	2+0
1	CBSC	Any skill module (5 credits each)	5 credits
<b>Total</b>			<b>25</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

#### **B.Sc. (Hons) Forestry:**

##### **Semester V (19 Credits)**

S. No.	Catalog	Course	Credit
1	SAF 3108	Hydrology and Watershed Management	2+1
2	NRM 3110	Climate Science	2+1
3	FPU 3105	Wood Sciences and Technology	2+1
4	FPU 3106	Logging and Ergonomics	1+1
5	SBS 3114	Forest Extension	1+1
6	SBS 3115	Community Forestry	1+0
6	SBS 3116	Entrepreneurship Development and Business Management	1+1
7	SBS 3117	Forest Economics and Marketing	2+1
<b>Total</b>			<b>19</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

**Semester-VI (20 Credits)**

S. No.	Catalog	Course	Credit
1	SAF 1204	Silviculture system	1+0
2	SBS 1105	Forest Botany/Basic Mathematics	1+1
3	SBS 2108	Statistical Methods & Experimental Designs	2+1
4	NRM.3212	Geomatics	1+2
5	SAF 3210	Recreation & Urban Forestry	1+1
6	NRM.3213	Restoration Ecology	1+1
7	FPU.3207	Marketing of Forest Products	2+1
8	FPU.3208	Certification of Forest Products	2+0
10	FBT3206	State Educational Tour (2 weeks)	0+2*
		<b>Total</b>	<b>20</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

**Semester-VII (20 Credits)**

S. No.	Catalog	Course	Credit
1	NRM 4114	Forest Inventory & Yield Predication	1+1
2	FBT.4107	Forest Biotechnology	1+1
3	SAF.4111	Agroforestry Systems and Management	1+1
4	WLS 4103	Wildlife Management	1+1
5	SBS 4117	Agriculture Informatics	1+1
6	PW	Project Work & Dissertation	0+10
		<b>Total</b>	<b>20</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

**Semester-VIII (23 Credits)**

S. No.	Catalog	Course	Credit
1		All India Educational Tour (3 weeks)	0+3
2		Industry Externship/Institutional attachment	05
3		Deep Rural Exploration	05
4		Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through, SWAYAM, MOOCS etc.	10
		<b>Total</b>	<b>23</b>

- Skill course of 3 credits needs to be added/replaced in exchange of existing credits (AI, ML, IOT, Digital Marketing etc.)

## **Annexure IV**



# **Framework for Implementation for New Education Policy 2020**

*Degree by Design for B. Sc Agri. Engg*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## **College of Agricultural Engineering and Technology**

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir  
Shalimar-190025 Jammu and Kashmir*

## Pathways to Certificate, Diploma and Degree Programme A case example in College of Agricultural Engineering and Technology

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, students project, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award
		Fundamental courses	Courses like, AI, ML, IOT, Data Sciences etc				
15 days Foundation Course							
1 <sup>st</sup>	I	16 ( credits )		-	Industrial attachment	Design and Installation of micro irrigation systems(1+2) Repair and maintenance of micro-irrigation systems(0+2)	Certificate Course ( Micro Irrigation )
	II	17	03	-	Industrial attachment	Sensors and Instrumentation interface for better results(1+2) Repair and maintenance of motors and pumps(0+2)	
2 <sup>nd</sup>	III	15	03	-	Industrial attachment	Design and Development of Basic Automation circuit(1+2) Design Layout of green house structures(0+2)	Diploma ( Protected cultivation)
	IV	16	03	-	Industrial attachment	Automation and Control for Agricultural Activities(1+2) Fabrication and maintenance of Hi-Tech greenhouse structures(0+2)	
3 <sup>rd</sup>	V	22	03	-		-	
	VI	18	03	-		-	
4 <sup>th</sup>	VII	4	03	16	<ul style="list-style-type: none"><li>Educational Tour (0+2)</li></ul>		B. Texh (Agricultural Engineering) ( Precision Water Management)
	VIII	6	03	16	<ul style="list-style-type: none"><li>Industry Externship/ Institutional attachment (0+5)</li><li>Experiential learning(0+5)</li></ul>		
Total		114	21	32	-	20	-

### Indicative list of Choice Based Skill and Vocational Courses for COAE&T

SNo	Name of the Course	Credits
1	Design and Development of Basic Automation circuit	3 (1+2)
2	Automation and Control for Agricultural Activities	3 (1+2)
3	E-Agriculture for sustainable agriculture and rural development	3 (1+2)
4	Sensors and Instrumentation interface for better results	3 (1+2)
5	Design and Installation of micro irrigation systems	3(1+2)
6	Repair and maintenance of micro-irrigation systems	2(0+2)
7	Design Layout of green house structures	2(0+2)
8	Fabrication of different greenhouse structures	2(0+2)
9	Fabrication and maintenance of Hi-Tech greenhouse structures	2(0+2)
10	Repair and maintenance of motors and pumps	2(0+2)
11	Ground water survey and testing	3(1+2)
12	Hydrological Modeling	3(1+3)
13	Protected Cultivation	(0+3)
14	Automation in greenhouse	(0+2)
15	Design and development of soilless cultivation structures	(0+2)
16	Repair and maintenance of Farm implements and machines.	(0+3)
17	Fabrication and maintenance of small tools and implements.	(0+2)
18	Operation and maintenance of tractors and other heavy equipment's	(0+3)
19	Operation and maintenance of workshop tools and equipment's	(0+3)
20	Borewell Digging, repair and maintenance.	(0+3)
21	Tractor Operation	(1+2)
22	Repair and maintenance of IC engine	(0+2)
23	Agriculture Machinery Repair and Maintenance	(0+5)
24	Engine overhauling	(0+5)
25	Tractor Maintenance and Overhauling	(0+5)



## Semester Wise Distribution of Courses

### Certificate Course in Agri. Engineering:

Semester I ( $16+3^*+5^{**}=24$ )

S.No.	Course No.	Course Title	Credit
1.	MATH-111	Engineering Mathematics-I	3(2+1)
2.	PHY-111	Engineering Physics	3(2+1)
3.	CHM-111	Engineering Chemistry	3(2+1)
4.	SOIL-111	Principles of Soil Science	3(2+1)
5.	CE-111	Surveying and Levelling	3(1+2)
6.	ME-111	Engineering Drawing	2(0+2)
7.	ME-112	Heat and Mass Transfer	2(2+0)
8.		Total Credits	19
9.		Choice Based Skill and Vocational Courses	05
<b>Total Credits</b>			<b>24</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for COAE&T

Semester II ( $17+3^*+5^{**}=23$ )

1.	MATH-122	Engineering Mathematics-II	3(2+1)
2.	COM-122	Entrepreneurship Development and Business Management	3(2+1)
3.	FMPE-121	Tractor and Automotive Engines	3(2+1)
4.	PFE-121	Engineering Properties of Agricultural Produce	2(1+1)
5.	CE-124	Engineering Mechanics	3(2+1)
6.	ME-123	Workshop Technology and Practices	3(1+2)
7.	IDE-121	Irrigation Engineering	3(2+1)
8.		Total Credits	20
9.		Choice Based Skill, Industrial attachment and Vocational Courses	05
<b>Total Credits</b>			<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for COAE&T

## DIPLOMA in Agri. Engineering :

Semester III (15+3\*+5\*\*=23)

1	HORT-211	Principles of Horticultural Crops and Plant Protection	2(1+1)
2	FMPE-212	Farm Machinery and Equipment-I	3(2+1)
3	MATH-213	Engineering Mathematics-III	3(2+1)
4	CE-215	Soil Mechanics	2(1+1)
5	PFE-211	Post Harvest Engineering of Cereals, Pulses and Oil Seeds	3(2+1)
6	ME-214	Machine Design	2(2+0)
7	ME-215	Thermodynamics, Refrigeration and Air Conditioning	3(2+1)
8		Total Credits	18
9		Choice Based Skill, industrial attachment and Vocational Courses	05
<b>Total Credits</b>			<b>23</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for COAE&T

Semester IV (16+3\*+5\*\*=24)

1	CE-226	Building Construction and Cost Estimation	2(2+0)
2	ME-226	Auto CAD Applications	2(0+2)
3	EE-221	Applied Electronics and Instrumentation	3(2+1)
4	ME-227	Theory of Machines	2(2+0)
5	FMPE-223	Farm Machinery and Equipment-II	3(2+1)
6	SWCE-222	Watershed Hydrology	2(1+1)
7	IDE-222	Sprinkler and Micro Irrigation Systems	2(1+1)
8	REE-221	Fundamentals of Renewable Energy Sources	3(2+1)
9		Total Credits	19
10		Choice Based Skill, Industrial attachment and Vocational Courses	05
<b>Total Credits</b>			<b>24</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for COAE&T

## B.Tech. (Agri. Engg.) :

Semester V (22+3\*=25 Credit Hours)

1	FMPE-314	Tractor Systems and Controls	3(2+1)
2	COM-313	Environmental Science and Disaster Management	3(2+1)
3	PFE-312	Agricultural Structures and Environmental Control	3(2+1)
4	EE-312	Electrical Machines and Power Utilization	3(2+1)
5	CE-317	Fluid Mechanics and Open Channel Hydraulics	3(2+1)
6	SWCE-313	Watershed Planning and Management	2(1+1)
6	IDE-313	Drainage Engineering	2(1+1)
7	REE-312	Renewable Power Sources	3(2+1)
8	AGRO-211	Principles of Agronomy	3(2+1)
<b>Total Credits</b>			<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VI (18+3\*=21 Credit Hours)

1	EE-323	Web Designing and Internet Applications	2(1+1)
2	EE-324	Computer Programming and Data Structures	3(1+2)
3	PFE-323	Post-Harvest Engineering of Horticultural Crops	2(1+1)
4	SWCE-324	Water Harvesting and Soil Conservation Structures	3(2+1)
5	IDE-324	Groundwater, Wells and Pumps	3(2+1)
6	FMPE-325	Tractor and Farm Machinery Operation and Maintenance	2(0+2)
7	PFE-324	Dairy and Food Engineering	3(2+1)
8	REE-323	Bio-energy Systems: Design and Applications	3(2+1)
<b>Total Credits</b>			<b>21</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VII (18+2\*=20 Credit Hours)

1	CAE-411	5- weeks Industrial Attachment /Internship (Student READY)	5(0+5)
2	CAE-412	5- weeks Experiential Learning on campus (Student READY)	5(0+5)
3	CAE-413	In-plant training-II (Student READY) Registration only	4(0+4)
4	CAE-414	Educational Tour (Registration only)	2 (0+2)
5	CE-112	Strength of Materials	2(1+1)
6	CE-123	Theory of Structures	2(1+1)
<b>Total Credits</b>			<b>20</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VIII (19+3\*=22 Credit Hours)

1	SWCE-211	Soil and Water Conservation Engineering	3(2+1)
2	COM-222	Entrepreneurship Development and Business Management	3(2+1)
3	DEPT	Elective course	3(2+1)
4	DEPT	Elective course	3(2+1)
5	DEPT	PPRW-421Project Planning and Report Writing (Student READY)	10(0+10)
<b>Total Credits</b>			<b>22</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

## Cafeteria Courses

S.No.	Elective Courses (Any 3 courses)	9 (6+3)
1	SWCE(E)-421 Floods and Control Measures	3(2+1)
2	SWCE(E)-422 Wasteland Development	3(2+1)
3	<b>SWCE(E)-423 Information Technology for Land and Water Management</b>	3(2+1)
4	<b>SWCE(E)-424 Remote Sensing and GIS Applications</b>	3(2+1)
5		
	IDE(E)-421 Management of Canal Irrigation System	
	3(2+1)	
6	IDE(E)-422 Minor Irrigation and Command Area Development	3(2+1)
7	<b>IDE(E)-423 Precision Farming Techniques for Protected Cultivation</b>	3(2+1)
8	IDE(E)-424 Water Quality and Management Measures	3(2+1)
9	IDE(E)-425 Landscape Irrigation Design and Management	3(2+1)
10	IDE(E)-426 Plastic Applications in Agriculture	3(2+1)
11	FMPE(E)-421 Mechanics of Tillage and Traction	3(2+1)
12	FMPE(E)-422 Farm Machinery Design and Production	3(2+1)
13	<b>FMPE(E)-423 Human Engineering and Safety</b>	<b>3(2+1)</b>
14	FMPE(E)-424 Tractor Design and Testing	3(2+1)
15	FMPE(E)-425 Hydraulic Drives and Controls	3(2+1)
16	<b>FMPE(E)-426 Precision Agriculture and System Management</b>	<b>3(2+1)</b>
17	<b>FMPE(E)-427 Artificial Intelligence</b>	<b>3(3+0)</b>
18	<b>FMPE(E)-428 Mechatronics</b>	<b>3(2+1)</b>
19	PFE(E)-421 Food Quality and Control	3(2+1)
20	PFE(E)-422 Food Plant Design and Management	3(2+1)
21	PFE(E)-423 Food Packaging Technology	3(2+1)
22	PFE(E)-424 Development of Processed Products	3(2+1)
23	PFE(E)-425 Process Equipment Design	3(2+1)
24	IDE(E)-421 Photovoltaic Technology and Systems	3(2+1)
25	IDE(E)-422 Waste and By-products Utilization	3(2+1)

## **Annexure V**



# Framework for Implementation for New Education Policy 2020

*Degree by Design for B. Sc Temperate Sericulture*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## ***Faculty of Temperate Sericulture***

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir*

*Mirgund, Pattan, Baramulla-193 121*

*Jammu and Kashmir*

## Proposed Path way to Certificate, Diploma and Degree Course in Sericulture in alignment with the NEP (2020)

Year	Semester	Core Credits	*Add to core curriculum courses like, AI, ML, IOT, Data Sciences etc	**Cafeteria of courses	Life skills like	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 Days Foundation Course</b>								
1 <sup>st</sup> Year	I	18	03		-	05	26	Certificate Course in Sericulture (Module Name)
	II	17	03		-	05	25	
2 <sup>nd</sup> Year	III	18	03		-	05	26	Diploma in Sericulture (Module Name)
	IV	17	03		-	05	25	
3 <sup>rd</sup> Year	V	22	03		-	-	25	BSc Hons. (Sericulture)
	VI	21	03		-	-	24	
4 <sup>th</sup> Year	VII	18	03		-	-	21	
	VIII	-	03	10	<ul style="list-style-type: none"> <li>Educational Tour (0+1)</li> <li>Industry Externship/ Institutional attachment (0+5)</li> <li>Deep Rural Exploration (0+5)</li> </ul>	-	24	
Total		131	24	10	11	20	196	
<p><b>*Needed to make students ready for the 4<sup>th</sup> industrial revolution</b>  <b>** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, AIIMS, IIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.</b>  <b>*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with diploma</b></p>								



## Pathways to Certificate, Diploma and Degree Programme A Case example in College of Temperate Sericulture

Yr.	Sem.	Core Courses		** Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester)	Award	
		Fundamental courses	Courses like, AI, ML, IOT, Data Sciences etc					
15 Days Foundation Course								
1 <sup>st</sup>	I	18 ( credits )	03 ( Credits)	10		Large Scale Production of Mulberry Saplings (Kissan Nursery) (1+2) Mulberry Pest and Disease Management (0+2)	Certificate Course (Mulberry Cultivation & Silkworm Rearing)	
	II	17	03			Chawki & Late age Silkworm rearing (1+2) Silkworm Disease Management		
2 <sup>nd</sup>	III	18	03			Loose egg preparation of silkworm hybrids (0+2) Acid Treatment & handling of Silkworm Eggs (0+3)	Diploma (Commercial Sericulture)	
	IV	17	03			Reeling Techniques For Quality Silk (0+3) Silk Fabric Manufacturing (0+2)		
3 <sup>rd</sup>	V	22	03			-		
	VI	21	03			-		
4 <sup>th</sup>	VII	18	03					
	VIII	-	03			<ul style="list-style-type: none"><li>• Educational Tour (0+1)</li><li>• Industry Externship/Institutional attachment (0+5)</li><li>• Deep Rural Exploration (0+5)</li></ul>		BSc Hons. (Sericulture)
Total		131	24	10	11	20	196	

## Indicative list of Choice Based Skill and Vocational Courses for Sericulture

S. No	Award	Skill Modules
1.	<p>Certificate Course in Sericulture/ <b>(Mulberry Cultivation &amp; Silkworm Rearing)</b></p> <p>Diploma in Sericulture / <b>(Commercial Sericulture)</b></p>	<p><b>Module 1: Mulberry Production</b></p> <ul style="list-style-type: none"> <li>• Large Scale Production of Mulberry Saplings (Kissan Nursery) (1+2)</li> <li>• Mulberry Pest and Disease Management (0+2)</li> </ul> <p><b>Module 2: Silkworm Rearing Technology</b></p> <ul style="list-style-type: none"> <li>• Chawki &amp; Late age Silkworm Rearing (1+2)</li> <li>• Silkworm Disease Management</li> </ul> <p><b>Module 3: Silkworm Seed Production</b></p> <ul style="list-style-type: none"> <li>• Loose Egg Preparation of Silkworm Hybrid (0+2)</li> <li>• Acid Treatment &amp; handling of Silkworm Eggs (0+3)</li> </ul> <p><b>Module 4: Silk Reeling Technology</b></p> <ul style="list-style-type: none"> <li>• Reeling Techniques For Quality Silk (0+3)</li> <li>• Silk Fabric Manufacturing (0+2)</li> </ul> <p><b>Module 5: Product Development in Sericulture</b></p> <ul style="list-style-type: none"> <li>• Silk Cocoon Handicrafts (0+3)</li> <li>• Bioconversion of sericulture waste products (0+2)</li> </ul> <p><b>Module 6: IFS in Sericulture</b></p> <ul style="list-style-type: none"> <li>• Sericulture – Poultry - integrated system (0+2)</li> <li>• Integrative Module for Mulberry Based Farming System (0+3)</li> </ul>

## Semester Wise Distribution of Courses

### Certificate Course in Sericulture:

Semester I ( $18+3^*+5^{**}=26$ )

S.No.	Course No.	Course Title	Credit
1.	AGR-122	Fundamentals of Plant Propagation and Nursery Management	1+1
2.	BAS-111	Introduction to Computers and Application	1+1
3.	SSC-111	Fundamentals of Soil Science	2+1
4.	CPT-111	History, Development and Organization of Sericulture Industry	1+0
5.	BAS-114	Comprehension and Communicative English	1+1
6.	PPA-222	Diseases of Host Plants of Silkworms	1+1
7.	MPT-121	Cultivation of Host Plants of silkworms	1+1
8.	MPT-122	Mulberry Production and Management	0+1
	NMS-311	Vanya Sericulture	2+1
Total Core Credits			18
9.		Choice Based Skill and Vocational Courses	05
10.		Skill course	03
<b>Total Credits</b>			<b>26</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### \*\* Choice Based Skill and Vocational Courses for College of Temperate Sericulture

Semester II ( $17+3^*+5^{**}=25$ )

1.	CPT-123	Mulberry Silkworm Rearing	2+1
2.	CPT-226	Bi-voltine Sericulture	0+2
3.	PCT-211	Raw Silk Technology	2+1
4.	SCP-221	Diseases of Silkworms & Management	2+1
5.	CPT-318	Silkworm Seed Technology	2+1
6.	EXT-222	Fundamentals of Extension and Rural Development	1+1
7.	EDS-322	Entrepreneurship Development in Sericulture	0+1
Total Core Credits			17
8.		Choice Based Skill and Vocational Courses	05
9.		Skill course	03
<b>Total Credits</b>			<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### \*\* Choice Based Skill and Vocational Courses for College of Temperate Sericulture

## DIPLOMA in Sericulture :

Semester III (18+3\*+5\*\*=26)

1.	CPT-122	Morphology and Systematics of silkworms	1+1
2.	CPT-124	Silkworm Anatomy and Physiology	1+1
3.	MPT-123	Botany and Cytology of host plants of silkworms	1+1
4.	ENT-213	Pests of silkworms & Management	1+1
5.	CPT-225	Cytology and Genetics of Silkworms	2+1
6.	ENT-315	Pests of Host Plants of Silkworms and their Management	1+1
7.	SSC-322	Soil Fertility and Nutrient Management	1+1
8.	SBT-321	Seri Bio-technology	2+1
Total Core Credits			10+8=18
9.		Choice Based Skill and Vocational Courses	05
10.		Skill course	03
<b>Total Credits</b>			<b>26</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for College of Temperate Sericulture

Semester IV (17+3\*+5\*\*=25)

1.	PBG-211	Genetics and Breeding of Host Plants of Silkworms	1+1
2.	PCT-212	Spun Silk Technology	0+1
3.	PCT-313	Silk Throwing, Dyeing and Weaving	0+2
4.	PCT-314	Physics and Chemistry of fibres	1+0
5.	CPT-317	Silkworm Breeding	2+1
6.	RGM-321	Resource Generation and Management in Sericulture	0+1
7.	PCT-326	Planning and Management of Silk Reeling Industry	2+0
8.	CPT-329	Commercial Silkworm Seed Production	0+1
9.	EDS-321	Entrepreneurship Development in Sericulture Crop Protection	0+1
10.	PCT-315	Apparels in Sericulture Industry	0+1
11.	SBM-321	Seri-Business Management	1+1
Total Core Credits			17
12.		Choice Based Skill and Vocational Courses	05
13.		Skill course	03
<b>Total Credits</b>			<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

\*\* Choice Based Skill and Vocational Courses for College of Temperate Sericulture

**B.Sc. (Hons) Sericulture :**

Semester V (22+3\*=25 Credit Hours)

1.	EXT-111	Fundamentals of Rural Sociology, Educational Psychology and constitution of India	0+2
2.	EVS-211	Environmental Science and Agro-ecology	1+0
3.	BAS-112	Agricultural Microbiology	1+1
4.	BAS-115	Physical Education, Health Education and Recreation	0+1(NC)
5.	AGR-123	Water management including micro-irrigation	1+1
6.	BAS-217	Plant Biotechnology	1+1
7.	EXT-313	Communication and Extension Methodologies for Transfer of Technology	2+1
8.	AGR-111	Introductory Agriculture, Principles of Agronomy & Soil Management	2+1
9.	PPA-211	Introduction to Plant Pathology and Nematology	1+1
10.	STAT-211	Agricultural Statistics	1+1
11.	MPT-325	Management of Sericultural Machineries and Equipments	0+1
12.	NSS	National Service Scheme	0+1(NC)
13.		Skill course	03
<b>Total Credits</b>			<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VI (21+3\*=24 Credit Hours)

1.	AEM-111	Principles of Agricultural Resource Economics	1+1
2.	BAS-113	Plant Biochemistry	1+1
3.	FOR-111	Introduction to Forestry	1+1
4.	BAS-126	Crop Physiology	2+1
5.	PPG-121	Principles of Genetics	2+1
6.	ENT-211	Insect Morphology and Systematics	2+1
7.	MPT-214	Farm Power, Renewable Energy, Surveying and soil water Engineering	2+1
8.	ENT-224	Pests of Crops and Stored Products and Management	2+1
9.		Skill course	03
<b>Total Credits</b>			<b>24</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VII (20+3\*=23 Credit Hours)

1.	ENT-212	Introduction to Apiculture	1+1
2.	BAS-228	Applied Microbiology	1+1
3.	HRT-221	Dry land Horticulture	1+1
4.	LFM-221	Livestock and Fish Production Management	2+1
5.	AGR-314	Agricultural Meteorology, Rainfed Agriculture and Watershed Management	1+1
6.	PBG-322	Principles of Seed Science and Technology	2+1
7.	AGR-325	Farming Systems, Organic farming and Sustainable Agriculture	2+1
8.	ETS-321	Experimental Techniques in Sericultural Research	1+1
9.		Skill course	03
<b>Total Credits</b>			<b>22</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

Semester-VIII (01+05+05+10+3\*=24 Credit Hours)

1.		Educational Tour	0+1 (NC)
2.		Industry Externship/Institutional attachment	05
3.		Deep Rural Exploration	05
4.		Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc. ( 10 credits)	10
5.		Skill course	03
<b>Total Credits</b>			<b>24</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

## **Annexure VI**





# **Framework for Implementation for New Education Policy 2020**

*Degree by Design for B. Sc Fisheries*

*Individual Division wise Skill/Trade courses*

*PG degree in sandwich mode with National and International Institutes*

## **Faculty Of Fisheries**

*Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir  
RANGIL, GANDERBAL-190001*

## Proposed Path way to Certificate, Diploma and Degree Course in B.F.Sc. Programme in alignment with the NEP (2020)

Year	Semester	Core Credits	*Add to core courses like, AI, ML, IOT, Data Sciences etc	**Cafeteria of courses	Life skills like	***Choice Based Skill Course (Modules)	Total	Outcome
<b>15 Days Foundation Course</b>								
1 <sup>st</sup> Year	I	18	03		-	05	26	Certificate Course in Fisheries (Module Name)
	II	17	03		-	05	25	
2 <sup>nd</sup> Year	III	18	03		-	05	26	Diploma in Fisheries (Module Name)
	IV	18	03		-	05	26	
3 <sup>rd</sup> Year	V	22	03		-	-	25	
	VI	24	03		-	-	27	
	VII	22	03		-	-	25	
4 <sup>th</sup> Year	VIII	-	03	10	<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> In-plant attachment/Industry Externship/Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)	-	24	B.F.Sc. (Hons.)
		139	24	10	11	20	204	
Total								
<p>* Needed to make students ready for the 4<sup>th</sup> industrial revolution</p> <p>** Students can leverage ABC for credit mobility by taking online courses on SWAYAM, MOOCS, QS Ranked Universities, Top ranking Indian Universities and Institutes like IITs, AIIMS, IISc etc. Student can earn these credits at any stage of the degree programme and claim them through ABC.</p> <p>*** Choice based skill modules to churn skilled workforce exiting with certificate courses and entrepreneurs exiting with diploma.</p>								

## Pathways to Certificate, Diploma and Degree Programme A Case example in Faculty of Fisheries

Yr.	Sem.	Core Courses		**Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through ,SWAYAM, MOOCS etc.*	Life skills like	Choice Based Skill and Vocational Courses ( 5 Credits each Semester) Modules of one Courses only as an example	Award	
		Fundamental courses	Courses like, AI, ML, IOT, Data Sciences etc					
15 Days Foundation Course								
1 <sup>st</sup>	I	18	03	10		Aquaculture Production Systems (2+1) Aquaculture: Scope, present status & Future prospectus (1+1)	Certificate course in Fisheries - Aquafarming / Ornamental Fisheries/ Fish Processing & Product Development/ Fish Health Management / Aquaponics/RAS	
	II	17	03			Design & Construction of Aquafarms (2+1) Nutrition & Feed Formulation (1+1) Reproduction & Breeding of commercial fish species (1+2) Larval Rearing & Live Fish Food Production (1+1)		
2 <sup>nd</sup>	III	18	03			Health Management in Aquaculture (2+1) Project formulation, legislation & Marketing in aquaculture (1+1))	Diploma in Fisheries - Aquafarming / Ornamental Fisheries/ Fish Processing & Product Development/ Fish Health Management	
	IV	18	03					
3 <sup>rd</sup>	V	22	03					
	VI	24	03					
	VII	22	03					
4 <sup>th</sup>	VIII	-	03			<input type="checkbox"/> Educational Tour (0+1) <input type="checkbox"/> Industry Externship/ Institutional attachment (0+5) <input type="checkbox"/> Deep Rural Exploration (0+5)		BFSc (Hons)
	Total	139	24	10	11	20	204	

## Indicative list of Choice Based Skill and Vocational Courses for Fisheries

S. No	Award	Skill Modules
1	<b>Certificate Course in Fisheries</b> (Aquafarming)  <b>Diploma in Fisheries</b> (Aquafarming)	<b>Module – I</b> Aquaculture Production Systems (2+1) Aquaculture: Scope, present status & Future prospectus (1+1)  <b>Module – II</b> Design & Construction of Aquafarms (2+1) Nutrition & Feed Formulation (1+1) <b>Module – III</b> Reproduction & Breeding of commercial fish species (1+2) Larval Rearing & Live Fish Food Production (1+1) <b>Module – IV</b> Health Management in Aquaculture (2+1) Project formulation, legislation & Marketing in aquaculture (1+1)
2	<b>Certificate Course in Fisheries</b> (Ornamental Fisheries)  <b>Diploma in Fisheries</b> (Ornamental Fisheries)	<b>Module – I</b> Ornamental Fisheries, Scope and Future Prospectus (2+1) Common Ornamental fishes & Plants (1+1) <b>Module – II</b> Reproduction & Breeding of Ornamental Fishes (1+2) Larval Rearing & Live Fish Food Production (1+1) <b>Module – III</b> Nutrition Requirements & Feed Formulation (2+1) Feed Management in Ornamental Fishes (1+1) <b>Module – IV</b> Health Management in Ornamental Fishes (1+2) Project formulation & Marketing in ornamental fish (1+1)

3	<p><b>Certificate Course in Fisheries</b> (Fish Processing and Product Development)</p> <p><b>Diploma in Fisheries</b> Fish (Processing and Product Development)</p>	<p><b>Module – I</b> Fish products and Value addition (1+2) Post mortem changes in fish and quality assessment (1+1)</p> <p><b>Module – II</b> Fish byproducts and waste utilization (1+2) Traditional fishery products (1+1)</p> <p><b>Module – III</b> Quality Assurance of Fish and Fishery products (2+1) Food labeling (1+1)</p> <p><b>Module – IV</b> Additives in fish processing (1+1) Toxins and contaminants (1+2)</p>
4	<p><b>Certificate Course in Fisheries</b> (Fish Health Management)</p> <p><b>Diploma in Fisheries</b> (Fish Health Management)</p>	<p><b>Module – I</b> Aqualife Health and Diagnostic Skills (2+1) Aquatic Animal Medicine (1+1)</p> <p><b>Module – II</b> Defence System in Fishes (1+1) Fish Parasitology and Diagnosis (1+2)</p> <p><b>Module – III</b> Fish Bacteriology and Diagnosis (1+1) Fish Virology and Diagnosis (2+1)</p> <p><b>Module – IV</b> Clinical Diagnosis of Fish Diseases (1+2) Fungal Diseases of fish and Diagnostic Procedures (1+1)</p>
5	<p><b>Certificate Course in Fisheries</b> (Aquaponics)</p>	<p><b>Module – I</b> Components of Aquaponic system (1+1) Management in Aquaponic system (1+2)</p> <p><b>Module – II</b> Aquaponics filtration systems. (1+1) Different bedding media in aquaponics system (1+2)</p>
6	<p><b>Certificate Course in Fisheries</b> (Recirculatory Aquaculture System (RAS))</p>	<p><b>Module – I</b> Principles of Recirculatory Aquaculture systems (1+1) Engineering designs in RAS (1+2)</p> <p><b>Module – II</b> Management in RAS (1+2) Application of RAS in coldwater fisheries (1+1)</p>

## **SEMESTER WISE DISTRIBUTION OF COURSE**

### **1: CERTIFICATE COURSE IN FISHERIES**

#### **SEMESTER I (18+05\*+03\*\* credits = 26 credits)**

S. No	Course No.	Course Title	Credit Hours
1	AQC-111	Principles of Aquaculture	2(1+1)
2	AQC-214	Fish Food Organisms	2(1+1)
3	FPHT-111	Fish in Nutrition	1(1+0)
4	AQC-216	Cold water Fish culture and Management	2(1+1)
5	FPHT-326	Fish Products, by products, value addition and waste management	3(2+1)
6	AEM-123	Limnology	3(2+1)
7	FGB-211	Genetics and Breeding	2(1+1)
8	FPATH-223	Therapeutics in Aquaculture	2(1+1)
9	SSC-112*	Communication Skills and Personality Development	1(0+1)
		<b>Total Credits</b>	<b>18 (10+8)</b>
10		<b>Choice Based Skill and Vocational Courses</b>	<b>05</b>
11		<b>Skill course</b>	<b>03</b>
		<b>Total Credits</b>	<b>26</b>

\* Choice Based Skill and Vocational Courses for BFSc programme of Faculty of Fisheries

\*\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

#### **SEMESTER II (17+05\*+03\*\* credits = 25 credits)**

S. No	Course No.	Course Title	Credit Hours
1	AQC-215	Ornamental Fish Production and Management	2(1+1)
2	AQC-329	Finfish Hatchery Management	3(2+1)
3	FNB-223	Fish Nutrition and Feed Technology	3(2+1)
4	FPHT-224	Fish Packaging & Canning Technology	3(2+1)
5	FPATH-212	Fish Immunology	2(1+1)
6	F-BIO-111	Taxonomy of Finfish	3(2+1)
7	SSC-214*	Physical Education, First Aid & Yoga	1(0+1)
		<b>Total Credits</b>	<b>17 (10+7)</b>
8		<b>Choice Based Skill and Vocational Courses</b>	<b>05</b>
9		<b>Skill course</b>	<b>03</b>
		<b>Total Credits</b>	<b>25</b>

\* Choice Based Skill and Vocational Courses for BFSc programme of Faculty of Fisheries

\*\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

## 2: DIPLOMA IN FISHERIES

### SEMESTER III (18+05\*+03\*\* credits = 26 credits)

S. No	Course No.	Course Title	Credit Hours
1	FPHT-212	Freezing Technology	2(1+1)
2	FENGG-313	Aquaculture Engineering	2(1+1)
3	AQC-122	Fresh Water Aquaculture	3(2+1)
4	AQC-123	Aquaculture in Reservoirs	2(1+1)
5	FPATH-326	Pathology of Cold Water Fishes	2(1+1)
6	FBIO-123	Anatomy and Biology of Finfish	3(2+1)
7	FBIO-124	Inland Fisheries	3(2+1)
8	SSC-216*	Swimming	1(0+1)
		<b>Total Credits</b>	<b>18 (10+8)</b>
9		<b>Choice Based Skill and Vocational Courses</b>	<b>05</b>
10		<b>Skill course</b>	<b>03</b>
		<b>Total Credits</b>	<b>26</b>

\* Choice Based Skill and Vocational Courses for BFSc programme of Faculty of Fisheries

\*\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### SEMESTER IV (18+05\*+03\*\* credits = 26 credits)

S. No	Course No.	Course Title	Credit Hours
1	AQC-228	Shellfish Hatchery Management	2(1+1)
2	FPATH-315	Pharmacology	2(1+1)
3	AEM-317	Fish Toxicology	2(1+1)
4	FENGG-312	Fishing Gear Technology	2(1+1)
5	AQC-227	Coastal Aquaculture and Mariculture	2(2+0)
6	FPHT-315	Microbiology of Fish and Fishery Products	3(2+1)
7	AEM-124	Marine Biology	3(2+1)
8	SSC-123	Information and Communication Technology	2(1+1)
		<b>Total Credits</b>	<b>18 (11+7)</b>
9		<b>Choice Based Skill and Vocational Courses</b>	<b>05</b>
10		<b>Skill course</b>	<b>03</b>
		<b>Total Credits</b>	<b>26</b>

\* Choice Based Skill and Vocational Courses for BFSc programme of Faculty of Fisheries

\*\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

### 3: BACHELOR OF FISHERIES SCIENCES, HONOURS (B.F.Sc. Hons)

#### SEMESTER V (22+03\* credits = 25 credits)

S. No	Course No.	Course Title	Credit Hours
1	F-BIO-112	Taxonomy of Shellfish	2(1+1)
2	AEM-111	Meteorology, Climatology and Geography	2(1+1)
3	FENGG-221	Fishing Craft Technology	2(1+1)
4	FNB-111	Fundamentals of Biochemistry	3(2+1)
5	FPATH-111	Fundamentals of Microbiology	3(2+1)
6	AEM-112	Soil and Water Chemistry	3(2+1)
7	AEM-215	Aquatic Ecology & Biodiversity	2(1+1)
8	FGB-322	Introduction to Biotechnology and Bioinformatics	2(1+1)
9	SSC-111	Statistical Methods	3(2+1)
		Total Credits	22 (13+9)
10		Skill course	03
		Total Credits	25

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

#### SEMESTER VI (24+03\* credits = 27 credits)

S. No	Course No.	Course Title	Credit Hours
1	AQC-227	Coastal Aquaculture and Mariculture	2(2+0)
2	SSC-227	Fisheries Extension Education	2(1+1)
3	FBIO-226	Aquatic Mammals, Reptiles and Amphibians	1(1+0)
4	FBIO-227	Coldwater/ Hill Fisheries Resources	3(2+1)
5	FNB-122	Food Chemistry	3(2+1)
6	AEM-216	Fishery Oceanography	2(1+1)
7	FENGG-324	Refrigeration and Equipment Engineering	3(2+1)
8	AEM-329	Aquatic Pollution	2(1+1)
9	FENGG-325	Fishing Technology	2(1+1)
10	FBIO-319	Marine Fisheries	2(1+1)
11	SSC-3210	Fisheries Business Management and Entrepreneurship Development	2(2+0)
		Total Credits	24 (16+8)
12		Skill course	03
		Total Credits	27



\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

**SEMESTER VII (22+03\* credits = 25 credits)**

S. No	Course No.	Course Title	Credit Hours
1	FBIO-318	Anatomy and Biology of Shellfish	2(1+1)
2	FBIO-3111	Sport Fisheries	2(1+1)
3	SSC-318	Fisheries Co-operatives and Marketing	2(1+1)
4	FENGG-326	Navigation and Seamanship	2(1+1)
5	FBIO-3110	Fish Population Dynamics and Stock Assessment	3(2+1)
6	SSC-329	Fisheries Policy and Law	1(1+0)
7	FPHT-327	Quality Assurance of Fish and Fishery Products	2(1+1)
8	SSC-215	Fisheries Economics	3(2+1)
9	AEM-318	Coastal Zone Management	2(1+1)
10	EVS-121 (AEM)	Environmental Studies & Disaster Management	3(2+1)
		<b>Total Credits</b>	<b>22 (13+9)</b>
11		<b>Skill course</b>	<b>03</b>
		<b>Total Credits</b>	<b>25</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

**SEMESTER VIII (21+03\* credits = 24 credits)**

S. No	Course No.	Course Title	Credit Hours
1	READY-427	Educational Tour	1(0+1)
2	READY-411	In-plant attachment (for 4 weeks)	5(0+5)
3		Deep Rural Exploration	5(0+5)
4		Cafeteria of courses on soft skills, higher order skills, business and entrepreneurial skills, creativity and innovation skills through, SWAYAM, MOOCS etc. ( 10 credits)	10(0+10)
5		<b>Skill course</b>	<b>3(0+3)</b>
6		<b>Total Credits</b>	<b>24 (0+24)</b>

\* Courses like, AI, ML, IOT, Data Sciences etc that need to be substituted

# Proposed Model of Education ©

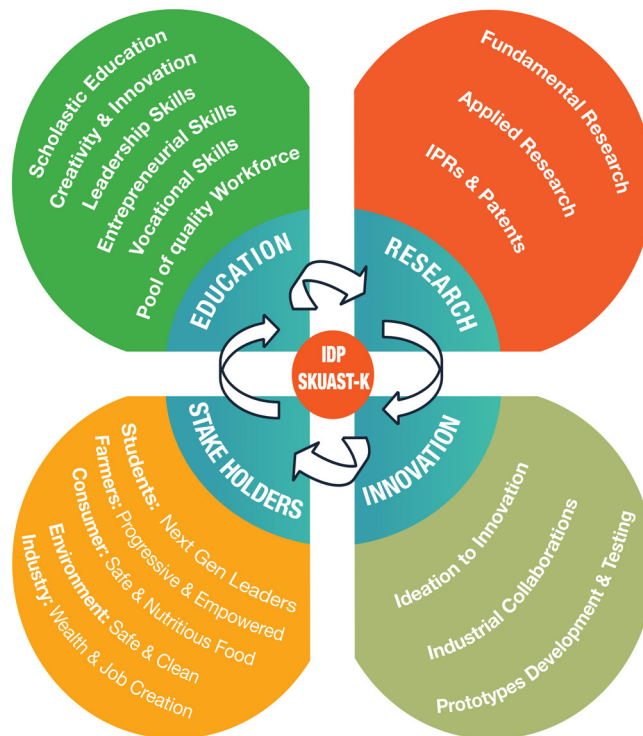


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