



The Kisumu National Polytechnic

INNOVATIVE APPROACHES AND INITIATIVES TO ENHANCE QUALITY AND RELEVANCE OF TVET AT THE KISUMU NATIONAL POLYTECHNIC



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Brief History of The Kisumu National Polytechnic

In an era defined by rapid technological advancements and economic transformation, Technical and Vocational Education and Training (TVET) institutions are pivotal in preparing a skilled workforce. By embracing innovative approaches and initiatives, TVET can enhance both the quality and relevance of its programs, ensuring that graduates are well-equipped to meet current and future industry demands.

The Kisumu National Polytechnic (TKNP) is a premier TVET institution in Kenya situated 3 km east of Kisumu City's central business district and approximately 349 Km from Nairobi, the Capital city of Kenya. TKNP began operations in 1967 as a technical secondary school, elevated to a Technical Training Institute in 1988 and further upgraded to a National Polytechnic

in 1996 with an aim of producing practically oriented human resource, competent in application of technical skills in the job market. TVET Act of 2013 and the Kisumu National Polytechnic Order of 2014 established The National Kisumu Polytechnic Governing Council which is responsible for providing leadership and strategic direction. The chief principal/ secretary to council is responsible for the day to day running of the institution.

The order also gave the institution a broader mandate in provision of Technical Vocational Training, Research and Innovations including: Advancing knowledge and its practical application by research and other means, the dissemination of outcomes of research by various means, and the commercial exploitation of research results; Participation in technological innovation as well as in the discovery, transmission and enhancement of

knowledge and to stimulate the intellectual life in the economic, social cultural, scientific, and technological development; Contribute to industrial and technological development of Kenya in collaboration with industry and other organizations through research and transfer of technology; Promote and establish a culture of innovation in engineering and technology, and technology transfer amongst staff and students;

Guided by its mission to produce globally competitive graduates through quality training, research, and innovation for sustainable development and its vision to be a world-class polytechnic nurturing entrepreneurs, innovators, and industry leaders, TKNP possesses the necessary infrastructure, expertise, Policies and legal status to administer Competency-Based Training, Dual Training and Recognition of Prior Learning (Competen-

cy-Based Assessments) and also undertake Applied Research and Dissemination of Research Findings.

At the heart of an effective TVET lies the integration of Training, Applied Research, and Innovations. The Kisumu National Polytechnic epitomizes this approach not only through deliberate investment in these areas but also nurturing TVET/Industry collaborations and knowledge exchange. The institution has ventured into the following innovative approaches and initiatives to enhance quality and relevance of its TVET programs:

Transforming Fish Farming for Small and Medium-Scale Farmers through Sustainable Fish feeds

The fishing industry in Kenya, particularly for small and medium-scale farmers, has faced significant challenges due to the high cost of fish feeds. The commercially available feeds, dependent on expensive protein sources such as silver cyprinid, have limited the profitability and sustainability of fish farming.

The Kisumu National Polytechnic (TKNP) through the Center for Applied Research and Innovation established in collaboration with The Colleges and Institutes Canada (CICan), exemplifies the transformative power this holistic approach and provides the catalyst for the implementation of practical solutions addressing market demands, productivity, economic prosperity and social well-being in a sustainable manner. The institution has taken bold steps to address this significant challenge through the development of affordable and sustainable fish feeds. Through meticulous research, the institution has perfected the process of development of alternative protein sources through breeding of black soldier fly (BSF) on organic waste and is currently formulating nutritionally balanced fish feeds using black soldier fly (BSF) larvae as an alternative protein source. This approach not only reduces the cost of feeds but also enhances their accessibility for small and medium-scale farmers. The result is a significant boost in the profitability and sustainability of fish farming operations.

TKNP recognizes that innovation in fish feed development must be accompanied by effective education and training. To this end, the institution is in the process of developing short-term competency-based courses on optimal fish nutrition and production. These programs are designed to disseminate knowledge and empower local communities, particularly youth and women, with the competencies and skills required to produce quality fish feeds. This empowerment contributes to enhanced food security, the creation of employment opportunities, and poverty alleviation in the region. Additionally, the Polytechnic has established demonstration fish-cage farms in Lake Victoria (Ogal Beach) to provide practical, hands-on learning experiences. These farms will serve as living laboratories where stakeholders can observe and practice innovative fish farming techniques, reinforcing the theoretical knowledge gained through the courses and ensuring successful implementation in real-world settings.



Installation & commissioning of demonstration fish-cage farms in Lake Victoria at Ogal beach

Pioneering Circular Solutions: Revolutionizing Recycling and Building Sustainability

Plastic waste has plagued communities worldwide, posing significant threats to ecosystems and human health. To address this issue, the TKNP Applied Research team of trainees and trainers are advancing a duo-innovative approach of a reverse vending waste management system and the utilization of recycled plastic waste for sustainable building solutions.

The groundbreaking initiative is aimed at incentivizing recycling and reducing litter through the deployment of a network of reverse vending machines in high-traffic areas. The project encourages recycling by rewarding a specified amount of cash for each plastic bottle returned by the consumers to the vending machine. This does not only encourage recycling but also drives public awareness and engagement in sustainable practices.

The collected plastic waste are then transformed into sustainable building and eco-friendly construction materials. The project leverages on an innovative injection molding technology developed at the institution to transform plastic granules into a myriad of sustainable building products. This project capitalizes on the abundance of plastic waste to produce electrical fittings, furniture, and building components for affordable housing projects. By diverting plastic waste from landfills and deforestation-prone materials, this initiative embodies the ethos of circularity, turning environmental challenges into opportunities for sustainable innovation.



PS SD-TVET Dr Esther Muoria Inspecting sustainable building and eco-friendly construction materials made from re-cycled plastic Revolutionizing Environmental conservation and Sustainable Energy Solutions

In the pursuit of sustainable energy solutions, two innovative projects are poised to revolutionize the way we address environmental challenges and meet our energy needs. The water hyacinth bioethanol fuel and water hyacinth briquettes production offers a transformative pathway towards a greener, more sustainable future.

Driven by the urgent need to address the environmental and economic impacts of water hyacinth infestation, this initiative aims to convert the menace into a valuable resource by harnessing the abundant biomass of water hyacinth. The project seeks to produce clean bioethanol fuel, offering a sustainable alternative to the expensive and environment unfriendly fossil fuels while mitigating the spread of the invasive plant. Recognizing the pressing need for affordable and eco-friendly cooking fuel, the waste products of the bioethanol fuel production are then utilized in the production of water hyacinth briquettes. The TKNP applied research team has also developed a gasifier stove that effectively uses the briquettes without polluting the environment.

The Regional Flagship TVET Institute for Textile Technology

The Kisumu National Polytechnic (TKNP) is establishing the Regional Flagship TVET Institute for Textile Technology (RFTITT) under the World Bank initiated Eastern Africa Skills for Transformation and Regional Integration Project (EASTRIP) whose main objective is to increase access and improve the quality of TVET programmes in the Eastern Africa Region.

A learning factory model has been adopted by the project and is under construction at TKNP. This is a comprehensive and integrated approach to TVET, designed to replicate the real-world industrial environments within an edu-

cational setting. This model aims to provide students with hands-on experience, bridging the gap between theoretical knowledge and practical application. By integrating state-of-the-art facilities, such as laboratories, design rooms, and production units (complete with textile technology equipment along the textile technology value chain), the Learning Factory Model ensures that students gain relevant and industry-specific skills by bringing the industry into the institutional learning space.

Central to the Learning Factory Model is the development of industry-relevant curricula. The institution has also developed highly specialized TVET programmes as well as industry-recognized short-term certificate level training aligned with the needs of the textile industry. These curricula have been designed to be competency-based, ensuring that graduates possess the skills required by employers



The front elevation of the proposed Blue Skills Training for Employment Center which has three blocks (Admin, lecture halls & workshops)

The Blue Skills Training for Employment Project (B-STEP),

Spearheaded by the Kisumu National Polytechnic and supported by the African Union Commission, and funded by the German Federal Ministry for Economic Cooperation and AUDA-NEPAD under Skills for Initiatives Africa aims to enhance employment opportunities for youth, women, and vulnerable individuals in the Lake Victoria basin through specialized training programs. The primary partner, the Kenya National Chamber of Commerce and Industry, plays a crucial role in identifying skills gaps, establishing industry advisory committees, and providing opportunities for internships and employment. The project is structured around core components that focuses on building learning infrastructure, procuring training equipment, training and provision of learner's scholarships. Training areas are designed to meet the demands of the blue economy, including eco-aquaculture, which encompasses fish caging technologies and urban aquaponic systems; blue-remediation, focusing on water hyacinth fiber processing technologies; and blue-preneurship, which promotes the production and sale of products derived from blue ecosystems, such as fish leather goods and water hyacinth artifacts. The project aims to create over 2,000 employment opportunities in these sectors.

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ACADEMIC PROGRAMMES PROGRAMS OFFERED AT TKNP

TKNP SCHOOL OF AGRICULTURE - RARIEDA CAMPUS					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
23	FIT 6	Fisheries Technology Level 6	KCSE C-	2 Years	TKNP
24	FIT 5	Fisheries Technology Level 5	KCSE D	1 Year	TKNP
25	FIT 4	Fisheries Technology Level 4	KCSE D-	6 Months	TKNP
26	ACQ 5	Aquaculture Level 5	KCSE D	1 Year	TKNP
27	ACQ 4	Aquaculture Level 4	KCSE D-	6 Months	TKNP
DEPARTMENT OF APPLIED SCIENCE & ENVIRONMENTAL STUDIES					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
28	FPT 6	Food Processing Technology Level 6	KCSE C-	2 Years	TKNP
29	FPT 5	Food Processing Technology Level 5	KCSE D+	1 Year	TKNP
30	SLT 6	Science Laboratory Technology with Instrumentation Level 6	KCSE C-	2 Years	TKNP
31	SCT 5	Science Laboratory Technology with Instrumentation Level 5	KCSE D+	1 Year	TKNP
32	EVT 6	Environmental Technology Level 6	KCSE C-	2 Years	TKNP
33	EIA	Environmental Impact Assessment	Diploma	3 Months	NEMA
DEPARTMENT OF HEALTH SCIENCES					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
34	MLS 6	Medical Laboratory Technology Level 6	KCSE C	2 Years	TVET-CDACC
35	NDT 6	Nutrition and Dietetics Level 6	KCSE C-	2 Years	TVET-CDACC
36	NDT 5	Nutrition and Dietetics Level 5	KCSE D	1 Year	TVET-CDACC
DEPARTMENT OF BUILDING & CIVIL ENGINEERING					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
37	ARC6	Architectural Technology Level 6	KCSE C-	2 Years	TVET-CDACC
38	BDG 6	Building Technician Level 6	KCSE C-	2 Years	TVET-CDACC
39	CVL 6	Civil Engineering Level 6	KCSE C-	2 Years	TVET-CDACC
40	PLG 5	Plumbing Level 5	KCSE D	1 Year	TVET-CDACC
41	PLG 4	Plumbing Level 4	KCSE D-	6 Months	TVET-CDACC
42	AMB5	Masonry Level 5	KCSE D	1 Year	TKNP
43	AMB4	Masonry Level 4	KCSE D-	6 Months	TKNP
44	LVS 6	Land Surveying Level 6	KCSE C-	2 Years	TVET-CDACC
45	LVS 5	Land Surveying Level 5	KCSE D	1 Year	TVET-CDACC
DEPARTMENT OF COMPUTING & INFORMATICS					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
46	JIT5	Digital Skills -JITUME	Open	3 Months	TKNP
47	ICT 6	Information Communication & Technology Level 6	KCSE C-	2Years	TKNP
48	ICT 5	Information Communication & Technology Level 5	KCSE D	1 Years	TKNP
49	REA 6	Records and Archives Level 6	KCSE C-	2Years	TKNP
50	CSC 6	Computer Science Level 6	KCSE C-	2Years	TVET-CDACC
DEPARTMENT OF BUSINESS & ENTREPRENEURSHIP STUDIES					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
51	BAF 6	Banking and Finance Level 6	KCSE C-	2Years	TVET-CDACC
52	BUM 6	Business Management Level 6	KCSE C-	2Years	TVET-CDACC
53	BUM 5	Business Management Level 5	KCSE D	1 Year	TVET-CDACC
54	HRM 6	Human Resource Management Level 6	KCSE C-	2Years	TVET-CDACC
55	HRM 5	Human Resource Management Level 5	KCSE D	1 Year	TVET-CDACC
56	SCM 6	Supply Chain Management Level 6	KCSE C-	2 Years	TVET-CDACC
57	SCM 5	Supply Chain Management Level 5	KCSE D	1 Year	TVET-CDACC
58	ACY 6	Accountancy Level 6	KCSE C-	2 Years	TVET-CDACC
59	ATD 5	Accounting Technician Diploma	KCSE C-	2 Years	KASNEB
60	CPA 5	Certified Public Accountants Part 1, II& III	KCSE C+ /Diploma	2 Years	KASNEB

DEPARTMENT OF HOSPITALITY & TOURISM					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
61	FBP6	Food and Beverage Production (Culinary Art) Level 6	KCSE C-	2 Years	TVET-CDACC
62	FBP5	Food and Beverage Production (Culinary Art) Level 5	KCSE C-	2 Years	TVET-CDACC
63	FBS6	Food and Beverage Sales & Service Management Level 6	KCSE C-	2 Years	TVET-CDACC
64	FBS5	Food and Beverage Sales & Service Management Level 5	KCSE C-	2 Years	TVET-CDACC
65	HSK6	Housekeeping & Accommodation Management Level 6	KCSE C-	2 Years	TVET-CDACC
66	HSK5	Housekeeping & Accommodation Management Level 5	KCSE D	1 Year	TVET-CDACC
67	HSK4	Housekeeping & Accommodation Management Level 4	KCSE D-	6 Months	TVET-CDACC
68	TRM6	Tourism Management Level 6	KCSE C-	2 Years	TVET-CDACC
69	TRM5	Tourism and Travel Management Level 5	KCSE D	1 Year	TVET-CDACC
70	EVT6	Events Management Level 6	KCSE C-	2 Years	TKNP
71	EVT5	Events Decoration Level 5	KCSE D	1 Year	TKNP
DEPARTMENT OF MECHANICAL AND AUTOMOTIVE ENGINEERING					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
72	AUT6	Automotive Technology Level 6	KCSE C-	2 Years	TKNP
73	PM06	Production Machine Operations and Maintenance Level 6	KCSE C-	2 Years	TKNP
74	AUE6	Automotive Engineering Level 6	KCSE C-	2 Years	TVET-CDACC
75	AUE5	Automotive Engineering Level 5	KCSE D	1 Year	TVET-CDACC
76	PLT6	Mechanical Plant Technology Level 6	KCSE C-	2 Years	TVET-CDACC
77	PDT6	Mechanical Technology & Maintenance Level 6	KCSE C-	2 Years	TVET-CDACC
78	PLT5	Mechanical Plant Engineering Level 5	KCSE D	1 Year	TVET-CDACC
79	WLD5	Welding and Fabrication Level 5	KCSE D	1 Year	TVET-CDACC
80	IPOM5	Industrial Plant Operations and Maintenance Level 5	KCSE D	1 Year	TVET-CDACC
81	IPOM4	Industrial Plant Operations and Maintenance Level 4	KCSE D-	6 Months	TVET-CDACC
82	ATG4	Automotive Technician Level 4	KCSE D-	6 Months	TVET-CDACC
83	AUR4	Autobody Repair Level 4	KCSE D-	6 Months	TVET-CDACC
84	EME4	Engine Mechanics Level 4	KCSE D-	6 Months	TVET-CDACC
85	DSI	Driving School Instructor	KCSE D & 4 Years Driving Experience	3Months	NTSA
86	DS	Driving School	National ID	1 Month	NTSA
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
87	EET6	Electrical Engineering (Power Option) Level 6	KCSE C-	2Years	TVET-CDACC
88	EET5	Electrical Operation (Power Option) Level 5	KCSE D	1Year	TVET-CDACC
89	EIT6	Electrical Installation Level 6	KCSE C-	2Years	TVET-CDACC
90	TEL6	Telecommunication Engineering Level 6	KCSE C-	2Years	TVET-CDACC
DEPARTMENT OF LIBERAL STUDIES					
	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	EXAMINING BODY
91	SCD6	Social work Level 6	KCSE C-	2 Years	TVET-CDACC
92	SCD5	Social work Level 5	KCSE D	1 Year	TVET-CDACC
DEPARTMENT OF FASHION DESIGN AND COSMETOLOGY					
SR No.	CODE	COURSE TITLE	MINIMUM REQUIREMENT	COURSE DURATION	
1	FAD6	Fashion and Apparel Design Level 6	KCSE C-	2 Years	
2	FAD5	Fashion and Apparel Design Level 5	KCSE D	1 Year	
3	FAD4	Fashion and Apparel Design Level 4	KCSE D-	6 Months	
4	TAN6	Tannery and Leather Technology Level 6	KCSE C-	2 Years	

5	TAN5	Leather Technology Level 5	KCSE D	1 Year
6	TAN4	Leather Works Level 4	KCSE D-	6 Months
7	SMT6	Textile Spinning Machine Technology Level 6	KCSE C-	2 Years
8	SMM5	Textile Spinning Machine Maintenance Level 5	KCSE D	1 Year
9	SMO4	Textile Spinning Machine Operations Level 4	KCSE D-	6 Months
10	FFT6	Fabric Formation Technology Level 6	KCSE C-	2 Years
11	FMT5	Fabric Formation Machine Maintenance Level 5	KCSE D	1 Year
12	FMO4	Fabric Formation Machine Operation Level 4	KCSE D-	1 Year
13	TPT6	Textile Processing Technology Level 6	KCSE C-	2 Years
14	TPM5	Textile Processing Maintenance Level 5	KCSE D	1 Year
15	TPD4	Textile Processing Machine Operation (Dyeing) Level 4	KCSE D-	1 Year
16	TPP4	Textile Processing Machine Operation (Printing) Level 4	KCSE D-	1 Year
17	TDP3	Tie and Dye Processing	KCSE D-	1 Month
18	KT03	Knitting Operations	KCSE D-	1 Month
19	HSP3	Hand Screen Printing	KCSE D-	1 Month
20	SMM3	Sewing Machine Maintenance	KCSE D-	1 Month
21	EMM3	Embroidery Machine Operations	KCSE D-	1 Month
22	FGC3	Freehand Garment Design, Cutting and Construction	KCSE D-	1 Month

ASSESSMENT & CERTIFICATION OF RECOGNITION OF PRIOR LEARNING (RPL)

S/NO	SKILLS TRADE AREA	MINIMUM REQUIREMENT	ASSESSMENT & CERTIFICATION
DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING			
1	Autobody Repair Level 4	3 Years in practice	TKNP
2	Engine Technology Level 4	3 Years in practice	TKNP
DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING			
3	CCTV Technology Level 4	3 Years in practice	TKNP
4	Solar PV Installation Level 4	3 Years in practice	TKNP
5	Electrical Alarm Security System Level 4	3 Years in practice	TKNP
6	Electrical Installation Technology Level 4	3 Years in practice	TKNP
DEPARTMENT OF FASHION DESIGN AND COSMETOLOGY			
7	Fashion & Apparel Design Level 4	3 Years in practice	TKNP
DEPARTMENT OF BUILDING & CIVIL ENGINEERING			
8	Masonry Level 4	3 Years in practice	TKNP
9	Plumbing Level 4	3 Years in practice	TKNP
TKNP RARIEDA SCHOOL OF AGRICULTURE			
10	Fisheries Technology Level 4	3 Years in practice	TKNP
11	Fisheries Technology Level 3	3 Years in practice	TKNP
12	Aquaculture Level 4	3 Years in practice	TKNP



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