LBS2ITS

**Curricula Enrichment delivered through
the Application of Location-based
Services to Intelligent Transport Systems**

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Erasmus+ Programme

Capacity Building in Higher Education

Report on the stakeholder survey results

WP 5.1. Survey of stakeholders

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Contents

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Document Overview

This document provides detailed results of the stakeholder survey conducted as part of the Work Package (WP) 5.1. Firstly, the overview of the survey is given with some conclusions of the results. Furthermore, expectations from the project partners are explicitly stated. This section is followed by the overall results as well as the results separated by the field of expertise of responders.

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About LBS2ITS

Project Title	**Curricula Enrichment delivered through the Application of Location-based Services to Intelligent Transport Systems**
Source of funding	EU EACEA ERASMUS+ KA2 ACTION (Capacity Building in Higher Education)
Coordinating Institution	Technische Universitaet Wien (TU Wien)
Project Coordinator	Guenther Retscher
Project Number	618657-EPP-1-2020-1-AT-EPPKA2-CBHE-JP
Website	lbs2its.net
Project total budget	965,465.00 EUR

The project 'Curricula Enrichment delivered through the Application of Location-based Services to Intelligent Transport Systems' – LBS2ITS aims to improve the teaching capacity of Sri Lankan Universities through developing of new curricula course modules in the field of LBS.

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About the survey and conclusions

This survey consists of 4 parts:

1. General information – aims to collect some classifying data of responders such as their level of education, area of expertise, type of their company/organisation, etc.
2. Information about graduates' employment – aims to collect some information about the type of graduates they are hiring and their satisfaction with graduates' knowledge
3. Relevance of LBS2ITS topics – is the heart of the survey. Here we ask multiple questions about the LBS2ITS topics and how they are relevant to them. We also ask open questions about what responders consider to be relevant knowledge for new graduates or for Sri Lanka society overall.
4. Your information – aims to collect the contact information of responders in case they are interested in answering more questions to us in future.

The key question becomes:" How can the results of this survey impact our project?"

It is expected that the project partners will utilise these results when they are designing their curricula for modernised modules and also for newly developed modules. When they do so, it is expected that this is stated in their module descriptors provided at the Workshop on core curricula course modules development (WP 5.2).

The results are satisfactory and confirm that this project has been on the right track and has a sense of what is necessary to improve curricula and potentially impact Sri Lankan society as a whole. The results confirm the relevancy of our topics and also the need for Problem Based Learning pedagogy as many responders indicated soft skills that are developed through it.

The results of this survey also made an impact on some of our Train the Teachers courses as we included the technology/software (e.g., QGIS) explicitly stated in this survey as a response to it.
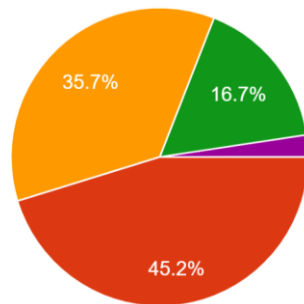
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Survey results

General information

What is your highest level of education?

1. Tertiary education   0% (0/42)
2. Bachelor's or equivalent   45.2% (19/42)
3. Master's or equivalent   35.7% (15/42)
4. Doctoral or equivalent   16.7% (7/42)
5. Adult education/ Continuing education   2.4% (1/42)

What is your area of expertise?

1. Geodesy/Surveying/Geomatics engineering   28.6% (12/42)
2. Computer science/IT   16.7% (7/42)
3. Electrical engineering   0%
4. Urban planning   23.8% (10/42)
5. Environmental engineering   0%
6. Transport engineering   21.4% (9/42)
7. Other: Project management   2.4% (1/42)
8. Other: Climate risk analysis   2.4% (1/42)
9. Other: Smart city development   2.4% (1/42)
10. Other: TIA expert   2.4% (1/42)
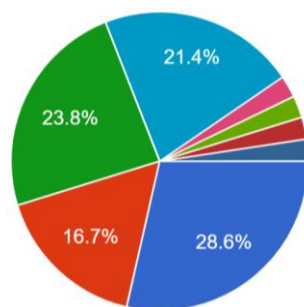
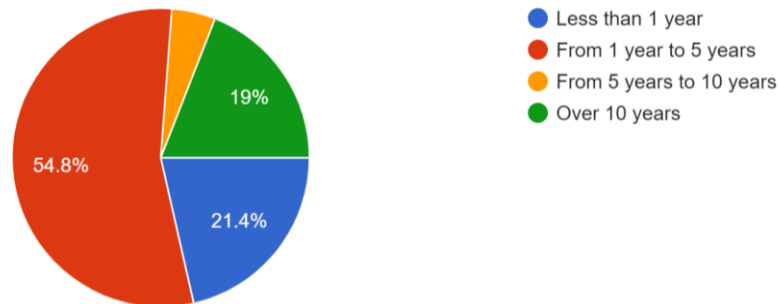What is your professional experience in the field related to Location Based Services and Intelligent Transport Systems?

1. Less than 1 year   21.4% (9/42)
2. From 1 year to 5 years   54.8% (23/42)
3. From 5 years to 10 years   4.8% (2/42)
4. Over 10 years   19% (8/42)

What is your position at your current company/organisation? (open question)

Summary of results (42 answers):

1. Lecturer, senior lecturer, instructor   19% (8/42)
2. Land surveyor, project surveyor   19% (8/42)
3. Assistant director, director or CEO   16.7% (7/42)
4. Government surveyor   9.5% (4/42)
5. PhD student, research assistant   7.1% (3/42)
6. Planning intern, trainees   7.1% (3/42)
7. Associate Professor, chairman   4.8% (2/42)
8. Town planner   4.8% (2/42)
9. Project lead   4.8% (2/42)
10. Forest Research Government UK   2.4% (1/42)
11. Climate risk analyst   2.4% (1/42)
12. GIS analyst   2.4% (1/42)

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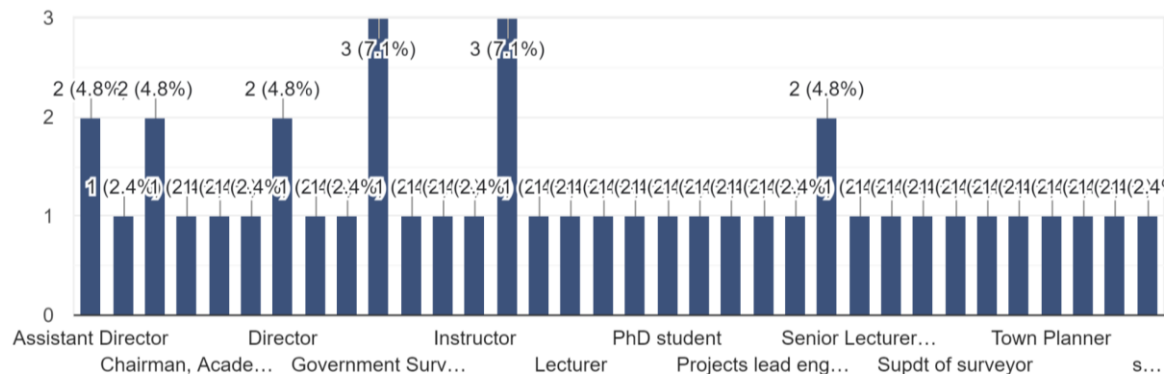
What company, organisation or government body do you work for? (open question)

All results (38 responses, responders were free to skip the question):

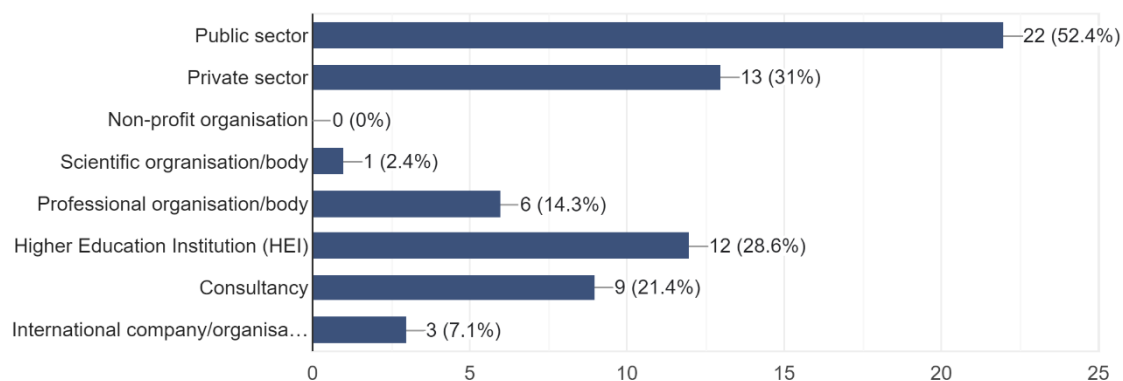|		
Sri Lanka Telecom Head Office	Government	Survey Department
Sri Lanka Telecom	University	private construction company
Real Destinations Pvt Ltd	Kdu	Government
GeoEDGE (Pvt) Ltd	university	UOM
Master Hellie's Engineering Consultants (Pvt.) Ltd	Sir John Kotelawala Defense University	General Sir John Kotelawala Defence University
ADB	Survey department of srilanka	Circle Consultancy (Pvt) Ltd
Urban Development Authority	Company	University of Calgary, Canada
DMC	Survey department of srilanka	John Keells Properties PVT LTD
Waitaki district council new zealand	Rukunu Development Contractors & Engineers pvt ltd	Lawrence Technological University
SLTDA	Survey Department	Coventry University
Urban Development Authority	NEM construction pvt ltd	Sri Lanka Survey Department
Sustainable Development Council	K.D.EBERT AND SONS HOLDINGS	General Sir John Kotelawala Defence University Sri Lanka
Government University	Survey Department of Sri Lanka	

Please choose the option or multiple options that characterise your company/organisation.

1. Public sector   52.4% (22/42)
2. Private sector   31% (13/42)
3. Non-profit organisation   0%
4. Scientific organisation/body   2.4% (1/42)
5. Professional organisation/body   14.3% (6/42)
6. Higher Education Institution (HEI)   28.6% (12/42)
7. Consultancy   21.4% (9/42)
8. International company/organisation   7.1% (3/42)

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What is your company/organisation's main activity? (open question)

All results:

GIS/RS Application development, Software Application development	Business consultancies and development project management	Preparation of Integrated Urban Development Plans
Disaster Managment	Real Estate Development	Tourism Development
University	Lending	Planning
Focal agency for SDGs	Higher Education, Research	Offering degrees
Higher education	Higher education	Teaching
Teaching	Cadastre surveying	Cadastral surveying
Education, City Planning, Positioning	Highway projects and Building Projects	Cadastral Surveying & Sporadic Surveying
Cadastre Surveying	Construction	Construction
Cadastre surveying	construction surveying	Surveying
Engineering Designs, Feasibility Studies, Construction Management, Graduate Education	Preparation of Traffic Impact Assessment, Environmental Assessments and other required feasibility studies	Our mission is to provide high quality land information products & services through professionally qualified and dedicated personnel
Undergraduate and post graduate studies, research	To provide correct Land Information System	Corporate training / consultancy in data science
Higher Education	Local authority	Education
Education	Education and research	Telecommunication
Providing tele-communication services	Data science education, corporate training	Forest and vegetation related activities

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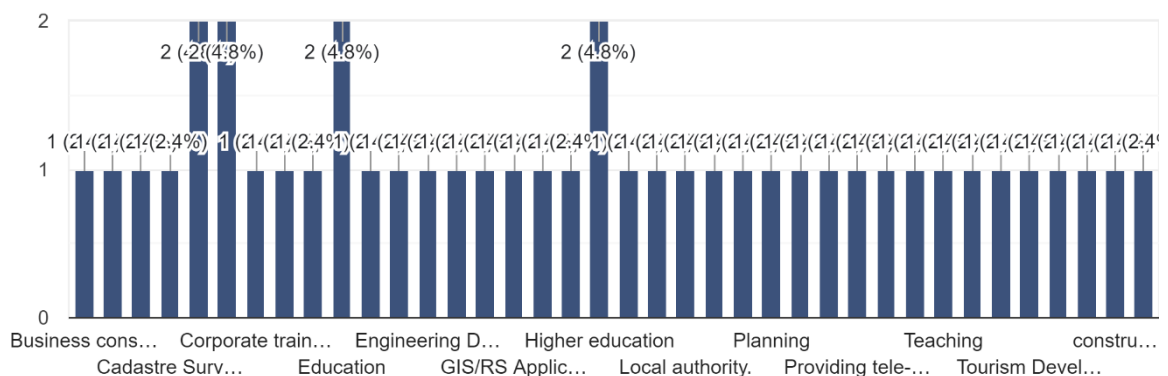
Information about graduates employment

Does your company/organisation employ recent graduates?
1. Yes   83.3% (35/42)
2. No   16.7% (7/42)
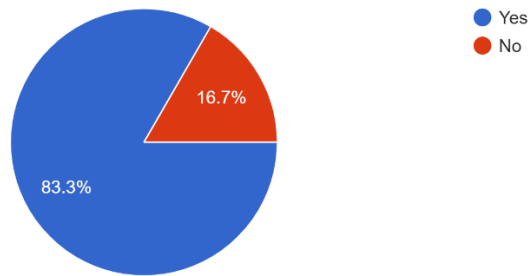
Are all graduates from the same discipline?
1. Yes   21.4% (9/42)
2. No   78.6% (33/42)
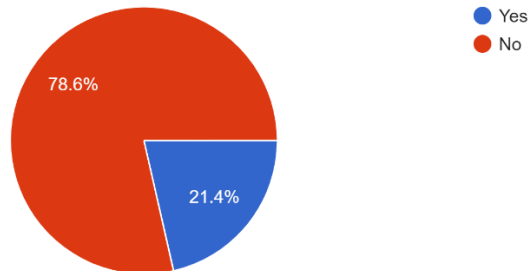
What are the disciplines related to LBS and ITS that your graduates come from?

1.	Geodesy/Surveying/Geomatics engineering	59.5% (25/42)
2.	Computer science/IT	47.6% (20/42)
3.	Electrical engineering	31% (13/42)
4.	Urban planning	42.9% (18/42)
5.	Environmental engineering	31% (13/42)
6.	Transport engineering	35.7% (15/42)
7.	Other	23.8% (10/42)

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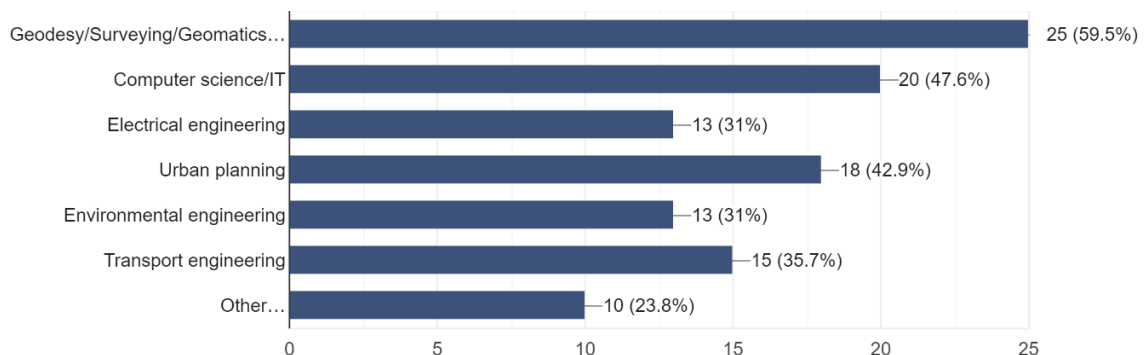
Are you content with the knowledge of your graduates after they graduate?
1. Yes   81% (34/42)
2. No   19% (8/42)
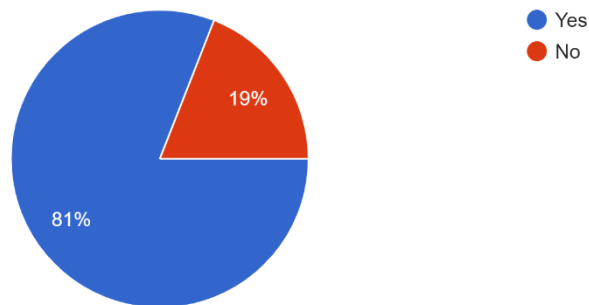
Do you think the education of your graduates can be or needs to be improved and modernised?
1. Yes   81% (34/42)
2. No   0%
3. Maybe 19% (8/42)
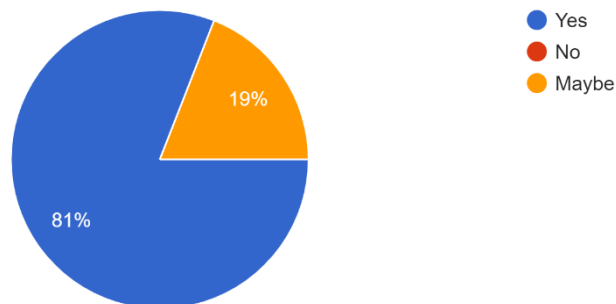
Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   59.5% (25/42)
2. No   9.5% (4/42)
3. Maybe 31% (13/42)

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Relevance of LBS2ITS topics

Please rate the relevance of the LBS2ITS topics in relation to your field of expertise.

Some responses do not sum up to 42 as some survey responders offered more than 2 answers for the same topic. Therefore, these answers were not taken into account when presenting results.

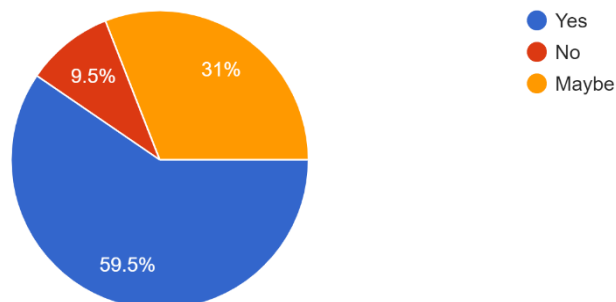| Topic	Not relevant	Relevant	Indifferent
Location Based Services	2.4% (1/42)	90.5% (38/42)	7.1% (3/42)
Localisation techniques	7.1% (3/42)	76.2% (32/42)	16.7% (7/42)
Positioning, Navigation and Timing technologies	4.8% (2/42)	85.7% (36/42)	9.5% (4/42)
GPS and GNSS	11.9% (5/42)	85.7% (36/42)	2.4% (1/42)
Smartphone positioning	16.7% (7/42)	78.6% (33/42)	4.8% (2/42)
Low-cost sensors for positioning, navigation and mapping	22% (9/41)	70.7% (29/41)	7.3% (3/41)
Cartography and geovisualisation	16.7% (7/42)	64.3% (27/42)	19% (8/42)
Web cartography	23.8% (10/42)	50% (21/42)	26.2% (11/42)
Sensor fusion	26.8% (11/41)	41.5% (17/41)	31.7% (13/41)
Estimation theory methodology	21.4% (9/42)	57.1% (24/42)	21.4% (9/42)
Spatial analysis	16.7% (7/42)	81% (34/42)	2.4% (1/42)
Smart city mobility	15% (6/40)	77.5% (31/40)	7.5% (3/40)
Understanding travel behaviour	19.5% (8/41)	70.7% (29/41)	9.8% (4/41)
Traffic engineering	20% (8/40)	62.5% (25/40)	17.5% (7/40)
Traffic safety	17.1% (7/41)	73.2% (30/41)	9.8% (4/41)
Traffic quality	20% (8/40)	67.5% (27/40)	12.5% (5/40)
Mobility concepts	19.5% (8/41)	65.9% (27/41)	14.6% (6/41)
Data and models in transportation	19% (8/42)	73.8% (31/42)	7.1% (3/42)
Interdisciplinary study project	17.1% (7/41)	70.7% (29/41)	12.2% (5/41)
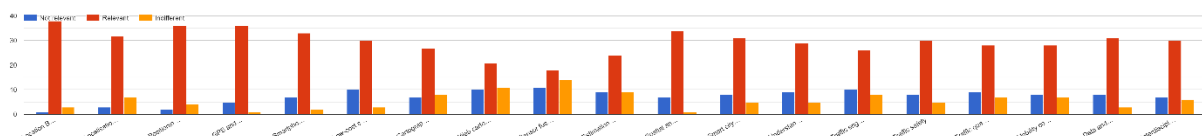
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Are there certain topics/tools/skills within the frame of LBS2ITS you would like Sri Lankan universities to teach their graduates?

All answers:

Machine learning , AI along with planning	How to integrate LBS in urban planning.	Smart travelling system
Advancing rural transportation systems, Tourist travel information systems, Transport system commercialization and marketing, Sustainable urban transportation systems, green transportation routs, Emergency Management Systems	Yes how the urban flood and transport planning should be integrate as the roads are the waterways in the flood management concept	Students should study Advance world technology ,Road construction and building construction , its better to inclide subjects that related to civil engineering related subjects its very useful for future works.

Sri Lankan universities should focus on imparting essential skills and knowledge related to Location-based Services (LBS) and Intelligent Transportation Systems (ITS) to their graduates. This includes expertise in geospatial data analysis, GPS technology, real-time data integration, traffic flow modeling, and mobile application development. Graduates should also be equipped with strong communication abilities to collaborate with stakeholders and promote innovation in the field. Additionally, emphasizing the importance of lifelong learning and adaptability will empower graduates to stay updated with emerging technologies and contribute effectively to sustainable and efficient transportation solutions.

User Experience Design: An understanding of UX design principles will help graduates create user-friendly and intuitive LBS and ITS applications.
Collaborative Mobility Solutions: Educating students on carpooling, ride-sharing, and other collaborative mobility concepts can help address traffic congestion and reduce carbon emissions.
Vehicle-to-Everything Communication: Teaching about V2X technologies and communication protocols will be important for graduates interested in smart transportation and autonomous vehicles.

Yes, strongly recommended for the graduates to teach this innovative technologies to enhance the qualities of day-to-day life of peoples with the modern and hitec implementation to the infrastructure of transportation of sri lanka.

Programing languages	QGIS	GNSS
Systems science and foundational computer science	Working with simulation tools to make decisions by evaluating different alternatives, quantify benefits / costs of certain interventions to urban environments	GIS application, data analysis, predictive analytics, traffic modeling, survey based data collection
mobile technology, GIS,data communication	Modern technology on surveying	Connected Automated Vehicles

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Smart concept (six main factors), Smart cities(Hard and soft factors) and smart mobility (ITS)	Drone Technology for Data Collection and Surveying, Smart Mobility and Environment	Intelligent transport in public transport, Real time traffic management methods
Traffic Simulation Models, Python, R Programming languages, big data technologies,	It is essential to focus on a combination of technical knowledge, practical skills, and broader competencies.	These topics and tools are using in the very lower level and different ways therefore, I would like to make them as a major subject in the related field such as planning, transport, engineering etc.
communication in oral and written forms	Devonshire skills	Innovative skills and adaptation for new technologies
Be life-long learners	Interdisciplinary study project	innovate
Yes	Yes	Yes
Yes	-	No more idea
No idea	N	Aa
I think no	Not clear	etc

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   69% (29/42)
2. No   4.8% (2/42)
3. Maybe   26.2% (11/42)
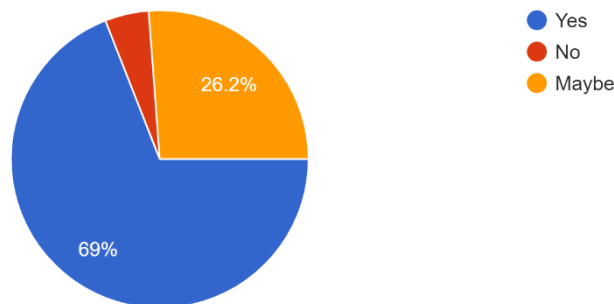
What are the most essential topics/tools/skills to be developed as part of the education?

All answers:

Modern ML and AI Technologies	AI tools, machine language / models	AI related technologies
Technical skills such as GIS & data analysis	PNT services (spatial enablement) ICT component and smart citizen	Positioning system

Geospatial Data Analysis, GPS and Navigation Technologies, Real-time Data Integration, Traffic Flow Modeling and Simulation, Mobile Application Development, Data Privacy and Security

Vehicle to Everything Communication is essential to be developed to ensure the sustainable transportation system

Employee Ethics, Working Discipline, Leadership through sports and extra curricular activities, Practical aspects of the technology and general thinking of the natural techniques and applications during the work.

Accessibility and benefits of using location based services rather than the conventional methods which are existing in this sector.	In my view, the coding skills need to be improved	Programming knowledge, stochastics models, optimization techniques, simulation tools / techniques
Intelligent Transport Systems	Route analysis	Mobility concepts
Data Analysis and Modelling	Cloud computing	Construction and civil engineering
social networks, navigation technologies, mobile technology	Location based traffic modelling, update with the legal frame work	Transportation Engineering, Traffic Management, sustainable transport operations
Human behaviour in terms of transportation, behavioural science	Advanced Driver Assistance Systems	Devops
Training	Sustainability, Marketability and Viability	skills - ability to work in interdisciplinary fileds, self study tools – programming topics - complex systems, computer science and cybersecurity
Analytical skills	Need theoretical knowledge with practical experiences	Analytical and critical thinking skills
Enhance the curriculum	Handling the practical issues with technologies.	Practical tasks in the reel world not only the theory based
practical knowledge	Practical side	Practical application
Communication	Communication	Practical experience
etc	-	Aa

Which skills do you consider to be potentially beneficial for the overall Sri Lankan society?

All answers:

Learning about Modern technology and free thinking	Advanced technology in IT and Electronics	Using AI technologies, location based services with autonomous features in a emergency situations.
GIS mapping	LBS	navigation technology, social network services, GPS

Perhaps understanding what mobility is. Not sure whether it's a skill. But their are lot of wrong ideas deeply rooted into the minds

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Construction knowledge and civil engineering knowledge will be benifit for survey professionals bcz university studies only useful to survey department only so should develop skills in project handling and construction

smart application, smart citizen and smart nation	Spatial analysis, smart mobility, traffic quality	Machine learning and programming skills
Smart Application development	Programming	IT
COMPUTER	Computer literacy	IT literacy
Transport Planning and Policy	Collaborative Mobility Solutions are more important to learn	Development of ITS applications
Evidence based planning skills	Traffic quality and safety	Taken conclusions and recommendations from real work project experiences

Basics of urban planning. The fundamental understanding that the role of urban transportation is to move more people (not more cars). Understanding the importance of neighborhood mobility

Analytical skills, ITS skills	Multi-disciplinary work collaboration	Advanced infrastructure planning skills, Smart technical innovation skills
Problem facing	Innovative thinking and economy/ business oriented thinking	Leadership, Consistence of getting to the goals, training for working at office environment at the Universities
Adaptive skills	Education and communication	Confident
LIS	Improve language skills	Attitude
practical knowledge	Give some important for physical practical	All of the above skills
-	Aa	etc

Do you have any other recommendations?

All answers:

Introduce AI and ML (new technologies) and discussion of upcoming technologies to every field	Traffic management, disaster management and emergency response	Applicability and reliability of the tools, use of machine learning and AI techniques for modeling
recommends Multidisciplinary learning curve	Research and learning applications should be done in right time with right approach	Public and private sector involvement in NSDI development for spatial enablement

Implementation of this project may high but after the study at least one tool or technique should be implemented in the real ground.

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Should include subject in surveying it should help our professionals to get opportunity in Europe and other countries and same time they should study construction to work in srilanka also without experience

Data driven society	ML and programing should be a must for the future graduates	Should facility to develop own abilities
Universities must be educated on the future job requirements and how to develop new courses accordingly	Civil engineers should be aware of data science and practical use of codes and program like python. not like developer. but should have knowledge on practical applications.	Quick methodologies and techniques to obtain the system back from a system failure and alternative methods to maximise the efficiency of outputs while in a system failure with traditional design.
Allocate adequate time and encourage for sports and other extra curricular to develop a capable person than a useless graduate with all academic thinking and capabilities only by forcing them for education only valued education system for higher education. The semester system should be changed back to the traditional education system that had before year 2002		
No/None/NO/no/NA x24	- x2	etc

Your information

In the last section of the survey, the responders were asked two questions:

Your name

Your e-mail

Majority offered these details in case we want to contact them in future. To preserve their anonymity, their names and email addresses will not be shared in this report.

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Survey results given responders' area of expertise

Urban planning (23.8%, 10/42)

What is your highest level of education?

1.	Tertiary education	0% (0/10)
2.	Bachelor's or equivalent	50% (5/10)
3.	Master's or equivalent	40% (4/10)
4.	Doctoral or equivalent	0% (0/10)
5.	Adult education/ Continuing education	10% (1/10)

What is your professional experience in the field related to LBS and ITS?

1.	Less than 1 year	60% (6/10)
2.	From 1 year to 5 years	30% (3/10)
3.	From 5 years to 10 years	10% (1/10)
4.	Over 10 years	0% (0/10)

What is your position at your current company/organisation? (open question)

1.	Assistant director, director or CEO	20% (2/10)
2.	PhD student, research assistant	10% (1/10)
3.	Planning intern, trainees	30% (3/10)
4.	Town planner	20% (2/10)
5.	Forest Research Government UK	10% (1/10)
6.	GIS analyst	10% (1/10)

Does your company/organisation employ recent graduates?

1.	Yes	90% (9/10)
2.	No	10% (1/10)

Are all graduates from the same discipline?

1.	Yes	0% (0/10)
2.	No	100% (10/10)

What are the disciplines related to LBS and ITS that your graduates come from?

1.	Geodesy/Surveying/Geomatics engineering	40% (4/10)
2.	Computer science/IT	50% (5/10)
3.	Electrical engineering	40% (4/10)
4.	Urban planning	60% (6/10)
5.	Environmental engineering	20% (2/10)
6.	Transport engineering	10% (1/10)
7.	Other	0% (0/10)

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Are you content with the knowledge of your graduates after they graduate?
1. Yes   80% (8/10)
2. No   20% (2/10)

Do you think the education of your graduates can be or needs to be improved and modernised?
1. Yes   90% (9/10)
2. No   0%
3. Maybe 10% (1/10)

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   70% (7/10)
2. No   0% (0/10)
3. Maybe 30% (3/10)

Please rate the relevance of the LBS2ITS topics in relation to your field of expertise.

Topic	Not relevant	Relevant	Indifferent
Location Based Services	0%	90% (9/10)	10% (1/10)
Localisation techniques	20% (2/10)	70% (7/10)	10% (1/10)
Positioning, Navigation and Timing technologies	10% (1/10)	70% (7/10)	20% (2/10)
GPS and GNSS	10% (1/10)	80% (8/10)	10% (1/10)
Smartphone positioning	0%	90% (9/10)	10% (1/10)
Low-cost sensors for positioning, navigation and mapping	22.2% (2/9)	55.6% (5/9)	22.2% (2/9)
Cartography and geovisualisation	10% (1/10)	60% (6/10)	30% (3/10)
Web cartography	20% (2/10)	50% (5/10)	30% (3/10)
Sensor fusion	22.2% (2/9)	33.3% (3/9)	44.4% (4/9)
Estimation theory methodology	20% (2/10)	60% (6/10)	20% (2/10)
Spatial analysis	10% (1/10)	90% (9/10)	0%
Smart city mobility	10% (1/10)	90% (9/10)	0%
Understanding travel behaviour	10% (1/10)	90% (9/10)	0%
Traffic engineering	10% (1/10)	60% (6/10)	30% (3/10)
Traffic safety	10% (1/10)	90% (9/10)	0%
Traffic quality	10% (1/10)	90% (9/10)	0%
Mobility concepts	10% (1/10)	80% (8/10)	10% (1/10)
Data and models in transportation	20% (2/10)	80% (8/10)	0%
Interdisciplinary study project	22.2% (2/9)	77.8% (7/9)	0%

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Are there certain topics/tools/skills within the frame of LBS2ITS you would like Sri Lankan universities to teach their graduates?

Machine learning , AI along with planning	QGIS	Programing languages
User Experience Design: An understanding of UX design principles will help graduates create user-friendly and intuitive LBS and ITS applications. Collaborative Mobility Solutions: Educating students on carpooling, ride-sharing, and other collaborative mobility concepts can help address traffic congestion and reduce carbon emissions. Vehicle-to-Everything Communication: Teaching about V2X technologies and communication protocols will be important for graduates interested in smart transportation and autonomous vehicles.		
It is essential to focus on a combination of technical knowledge, practical skills, and broader competencies.		
These topics and tools are using in the very lower level and different ways therefore, I would like to make them as a major subject in the related field such as planning, transport, engineering etc.		
How to integrate LBS in urban planning.		
Yes	Yes	etc

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   90% (9/10)
2. No   0%
3. Maybe 10% (1/10)

What are the most essential topics/tools/skills to be developed as part of the education?

Modern ML and AI Technologies	AI tools, machine language / models	Technical skills such as GIS & data analysis
AI related technologies	Data Analysis and Modeling	Practical application
Handling the practical issues with technologies.		
Vehicle to Everything Communication is essential to be developed to ensure the sustainable transportation system		
	-	etc

Which skills do you consider to be potentially beneficial for the overall Sri Lankan society?

Advanced technology in IT and Electronics	GIS mapping	Programming
IT	Transport Planning and Policy	Problem facing
Learning about Modern technology and free thinking		
Innovative thinking and economy/ business oriented thinking		
Collaborative Mobility Solutions are more important to learn		
		etc

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Do you have any other recommendations?

Introduce AI and ML (new technologies) and discussion of upcoming technologies to every field.		
Traffic management, disaster management and emergency response		
Research and learning applications should be done in right time with right approach		
Implementation of this project may high but after the study at least one tool or technique should be implemented in the real ground.		
No X4	-	etc

Computer science/IT (16.7%, 7/42)

What is your highest level of education?

1.	Tertiary education	0% (0/7)
2.	Bachelor's or equivalent	14.3% (1/7)
3.	Master's or equivalent	28.6% (2/7)
4.	Doctoral or equivalent	57.1% (4/7)
5.	Adult education/ Continuing education	0% (0/7)

What is your professional experience in the field related to LBS and ITS?

1.	Less than 1 year	28.6% (2/7)
2.	From 1 year to 5 years	42.9% (3/7)
3.	From 5 years to 10 years	0% (0/7)
4.	Over 10 years	28.6% (2/7)

What is your position at your current company/organisation? (open question)

1.	Assistant director, director or CEO	14.3% (1/7)
2.	Lecturer, senior lecturer, instructor	85.7% (6/7)

Does your company/organisation employ recent graduates?
1. Yes   100% (7/7)
2. No   0%

Are all graduates from the same discipline?
1. Yes   0% (0/7)
2. No   100% (7/7)

What are the disciplines related to LBS and ITS that your graduates come from?

1.	Geodesy/Surveying/Geomatics engineering	42.9% (3/7)
2.	Computer science/IT	85.7% (6/7)
3.	Electrical engineering	42.9% (3/7)
4.	Urban planning	28.6% (2/7)
5.	Environmental engineering	28.6% (2/7)
6.	Transport engineering	28.6% (2/7)

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7. Other   14.3% (1/7)

Are you content with the knowledge of your graduates after they graduate?
1. Yes   100% (7/7)
2. No   0%

Do you think the education of your graduates can be or needs to be improved and modernised?
1. Yes   85.7% (6/7)
2. No   0%
3. Maybe   14.3% (1/7)

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   57.1% (4/7)
2. No   14.3% (1/7)
3. Maybe   28.6% (2/7)

Please rate the relevance of the LBS2ITS topics in relation to your field of expertise.

Topic	Not relevant	Relevant	Indifferent
Location Based Services	14.3% (1/7)	85.7% (6/7)	0%
Localisation techniques	0%	85.7% (6/7)	14.3% (1/7)
Positioning, Navigation and Timing technologies	0%	100% (7/7)	0%
GPS and GNSS	28.6% (2/7)	71.4% (5/7)	0%
Smartphone positioning	0%	100% (7/7)	0%
Low-cost sensors for positioning, navigation and mapping	28.6% (2/7)	71.4% (5/7)	0%
Cartography and geovisualisation	28.6% (2/7)	71.4% (5/7)	0%
Web cartography	28.6% (2/7)	71.4% (5/7)	0%
Sensor fusion	14.3% (1/7)	71.4% (5/7)	14.3% (1/7)
Estimation theory methodology	28.6% (2/7)	71.4% (5/7)	0%
Spatial analysis	42.9% (3/7)	57.1% (4/7)	0%
Smart city mobility	14.3% (1/7)	57.1% (4/7)	28.6% (2/7)
Understanding travel behaviour	14.3% (1/7)	71.4% (5/7)	14.3% (1/7)
Traffic engineering	33.3% (2/6)	50% (3/6)	16.7% (1/6)
Traffic safety	14.3% (1/7)	71.4% (5/7)	14.3% (1/7)
Traffic quality	28.6% (2/7)	42.9% (3/7)	28.6% (2/7)
Mobility concepts	28.6% (2/7)	57.1% (4/7)	14.3% (1/7)
Data and models in transportation	0%	100% (7/7)	0%
Interdisciplinary study project	0%	57.1% (4/7)	42.9% (3/7)

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Are there certain topics/tools/skills within the frame of LBS2ITS you would like Sri Lankan universities to teach their graduates?

Devonshire skills	Innovative skills and adaptation for new technologies	mobile technology, GIS,data communication
Sri Lankan universities should focus on imparting essential skills and knowledge related to Location-based Services (LBS) and Intelligent Transportation Systems (ITS) to their graduates. This includes expertise in geospatial data analysis, GPS technology, real-time data integration, traffic flow modeling, and mobile application development. Graduates should also be equipped with strong communication abilities to collaborate with stakeholders and promote innovation in the field. Additionally, emphasizing the importance of lifelong learning and adaptability will empower graduates to stay updated with emerging technologies and contribute effectively to sustainable and efficient transportation solutions.		
"Yes how the urban flood and transport planning should be integrate as the roads are the waterways in the flood management concept "		
	N	Aa

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   57.1% (4/7)
2. No   28.6% (2/7)
3. Maybe 14.3% (1/7)

What are the most essential topics/tools/skills to be developed as part of the education?

Intelligent Transport Systems	Devops	Cloud computing
Enhance the curriculum	social networks, navigation technologies, mobile technology	Aa
Geospatial Data Analysis, GPS and Navigation Technologies, Real-time Data Integration, Traffic Flow Modeling and Simulation, Mobile Application Development, Data Privacy and Security		

Which skills do you consider to be potentially beneficial for the overall Sri Lankan society?

Smart Application development	LBS	Computer literacy
Adaptive skills	Development of ITS applications	Aa
navigation technology, social network services, GPS		

Do you have any other recommendations?

recommends Multidisciplinary learning curve
No X6

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Transport engineering (21.4%, 9/42)

What is your highest level of education?

1.	Tertiary education	0% (0/9)
2.	Bachelor's or equivalent	0% (0/9)
3.	Master's or equivalent	66.7% (6/9)
4.	Doctoral or equivalent	33.3% (3/9)
5.	Adult education/ Continuing education	0% (0/9)

What is your professional experience in the field related to LBS and ITS?

1.	Less than 1 year	11.1% (1/9)
2.	From 1 year to 5 years	55.6% (5/9)
3.	From 5 years to 10 years	0% (0/9)
4.	Over 10 years	33.3% (3/9)

What is your position at your current company/organisation? (open question)

1.	Lecturer, senior lecturer, instructor	22.2% (2/9)
2.	Assistant director, director or CEO	33.3% (3/9)
3.	PhD student, research assistant	22.2% (2/9)
4.	Associate Professor, chairman	11.1% (1/9)
5.	Project lead	11.1% (1/9)

Does your company/organisation employ recent graduates?

1.	Yes	77.8% (7/10)
2.	No	22.2% (2/10)

Are all graduates from the same discipline?

1.	Yes	11.1% (1/9)
2.	No	88.9% (8/9)

What are the disciplines related to LBS and ITS that your graduates come from?

1.	Geodesy/Surveying/Geomatics engineering	55.6% (5/9)
2.	Computer science/IT	66.7% (6/9)
3.	Electrical engineering	33.3% (3/9)
4.	Urban planning	55.6% (5/9)
5.	Environmental engineering	44.4% (4/9)
6.	Transport engineering	100% (9/9)
7.	Other	33.3% (3/9)

Are you content with the knowledge of your graduates after they graduate?

1.	Yes	66.7% (6/9)
2.	No	33.3% (3/9)

Do you think the education of your graduates can be or needs to be improved and modernised?
1. Yes   77.8% (7/9)
2. No   0% (0/9)
3. Maybe 22.2% (2/9)

Would you characterise the knowledge of your graduates as interdisciplinary?
4. Yes   77.8% (7/9)
5. No   11.1% (1/9)
6. Maybe 11.1% (1/9)

Please rate the relevance of the LBS2ITS topics in relation to your field of expertise.

Topic	Not relevant	Relevant	Indifferent
Location Based Services	0%	100% (9/9)	0%
Localisation techniques	0%	66.7% (6/9)	33.3% (3/9)
Positioning, Navigation and Timing technologies	0%	77.8% (7/9)	22.2% (2/9)
GPS and GNSS	11.1% (1/9)	88.9% (8/9)	0%
Smartphone positioning	11.1% (1/9)	88.9% (8/9)	0%
Low-cost sensors for positioning, navigation and mapping	0%	100% (9/9)	0%
Cartography and geovisualisation	22.2% (2/9)	44.4% (4/9)	33.3% (3/9)
Web cartography	11.1% (1/9)	33.3% (3/9)	55.6% (5/9)
Sensor fusion	22.2% (2/9)	44.4% (4/9)	33.3% (3/9)
Estimation theory methodology	11.1% (1/9)	77.8% (7/9)	11.1% (1/9)
Spatial analysis	0%	100% (9/9)	0%
Smart city mobility	0%	100% (9/9)	0%
Understanding travel behaviour	0%	100% (9/9)	0%
Traffic engineering	0%	100% (9/9)	0%
Traffic safety	0%	100% (9/9)	0%
Traffic quality	0%	100% (9/9)	0%
Mobility concepts	0%	100% (9/9)	0%
Data and models in transportation	11.1% (1/9)	88.9% (8/9)	0%
Interdisciplinary study project	11.1% (1/9)	77.8% (7/9)	11.1% (1/9)

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Are there certain topics/tools/skills within the frame of LBS2ITS you would like Sri Lankan universities to teach their graduates?

GNSS	Connected Automated Vehicles	Systems science and foundational computer science
Traffic Simulation Models, Python, R Programming languages, big data technologies,		
Drone Technology for Data Collection and Surveying, Smart Mobility and Environment		
Working with simulation tools to make decisions by evaluating different alternatives, quantify benefits / costs of certain interventions to urban environments		
Intelligent transport in public transport, Real time traffic management methods		
communication in oral and written forms	Interdisciplinary study project	

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   55.6% (5/9)
2. No   0%
3. Maybe 44.4% (4/9)

What are the most essential topics/tools/skills to be developed as part of the education?

In my view, the coding skills need to be improved	Transportation Engineering, Traffic Management, sustainable transport operations	Human behavior in terms of transportation, behavioral science
skills - ability to work in interdisciplinary fileds, self study tools - programming topics - complex systems, computer science and cybersecurity		
Employee Ethics, Working Discipline, Leadership through sports and extra curricular activities, Practical aspects of the technology and general thinking of the natural techniques and applications during the work.		
Programming knowledge, stochastics models, optimization techniques, simulation tools / techniques		
Communication	Analytical and critical thinking skills	Advanced Driver Assistance Systems

Which skills do you consider to be potentially beneficial for the overall Sri Lankan society?

Analytical skills, ITS skills	All of the above skills	Multi-disciplinary work collaboration
Spatial analysis, smart mobility, traffic quality	Machine learning and programming skills	IT literacy
Perhaps understanding what mobility is. Not sure whether it's a skill. But their are lot of wrong ideas deeply rooted into the minds		
Leadership, Consistence of getting to the goals, training for working at office environment at the Universities,		

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Basics of urban planning. The fundamental understanding that the role of urban transportation is to move more people (not more cars). Understanding the importance of neighborhood mobility

Do you have any other recommendations?

Allocate adequate time and encourage for sports and other extra curricular to develop a capable person than a useless graduate with all academic thinking and capabilities only by forcing them for education only valued education system for higher education. The semester system should be changed back to the traditional education system that had before year 2002

Universities must be educated on the future job requirements and how to develop new courses accordingly

Civil engineers should be aware of data science and practical use of codes and program like python. not like developer. but should have knowledge on practical applications.

ML and programing should be a must for the future graduates

No X5

Geodesy/Surveying/Geomatics engineering (28.6%, 12/42)

What is your highest level of education?

1.	Tertiary education	0%
2.	Bachelor's or equivalent	100% (12/12)
3.	Master's or equivalent	0%
4.	Doctoral or equivalent	0%
5.	Adult education/ Continuing education	0%

What is your professional experience in the field related to LBS and ITS?

1.	Less than 1 year	0% (0/12)
2.	From 1 year to 5 years	83.3% (10/12)
3.	From 5 years to 10 years	8.3% (1/12)
4.	Over 10 years	8.3% (1/12)

What is your position at your current company/organisation? (open question)

1.	Land surveyor, project surveyor	66.7% (8/12)
2.	Government surveyor	33.3% (4/12)

Does your company/organisation employ recent graduates?

1.	Yes	75% (9/12)
2.	No	25% (3/12)

Are all graduates from the same discipline?

1.	Yes	58.3% (7/12)
2.	No	41.7% (5/12)

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What are the disciplines related to LBS and ITS that your graduates come from?

1. Geodesy/Surveying/Geomatics engineering   100% (12/12)
2. Computer science/IT   16.7% (2/12)
3. Electrical engineering   16.7% (2/12)
4. Urban planning   8.3% (1/12)
5. Environmental engineering   25% (3/12)
6. Transport engineering   8.3% (1/12)
7. Other   25% (3/12)

Are you content with the knowledge of your graduates after they graduate?
3. Yes   83.3% (10/12)
4. No   16.7% (2/12)

Do you think the education of your graduates can be or needs to be improved and modernised?
4. Yes   83.3% (10/12)
5. No   0%
6. Maybe   16.7% (2/12)

Would you characterise the knowledge of your graduates as interdisciplinary?
4. Yes   41.7% (5/12)
5. No   16.7% (2/12)
6. Maybe   41.7% (5/12)

Please rate the relevance of the LBS2ITS topics in relation to your field of expertise.

Topic	Not relevant	Relevant	Indifferent
Location Based Services	0%	83.3% (10/12)	16.7% (2/12)
Localisation techniques	8.3% (1/12)	83.3% (10/12)	8.3% (1/12)
Positioning, Navigation and Timing technologies	0%	100% (12/12)	0%
GPS and GNSS	0%	100% (12/12)	0%
Smartphone positioning	33.3% (4/12)	58.3% (7/12)	8.3% (1/12)
Low-cost sensors for positioning, navigation and mapping	33.3% (4/12)	66.7% (8/12)	0%
Cartography and geovisualisation	8.3% (1/12)	75% (9/12)	16.7% (2/12)
Web cartography	25% (3/12)	58.3% (7/12)	16.7% (2/12)
Sensor fusion	33.3% (4/12)	41.7% (5/12)	25% (3/12)
Estimation theory methodology	25% (3/12)	33.3% (4/12)	41.7% (5/12)
Spatial analysis	25% (3/12)	66.7% (8/12)	8.3% (1/12)
Smart city mobility	40% (4/10)	50% (5/10)	10% (1/10)

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Understanding travel behaviour	54.5% (6/11)	27.3% (3/11)	18.2% (2/11)
Traffic engineering	45.5% (5/11)	36.4% (4/11)	18.2% (2/11)
Traffic safety	45.5% (5/11)	36.4% (4/11)	18.2% (2/11)
Traffic quality	50% (5/10)	30% (3/10)	20% (2/10)
Mobility concepts	45.5% (5/11)	18.2% (2/11)	36.4% (4/11)
Data and models in transportation	41.7% (5/12)	41.7% (5/12)	16.7% (2/12)
Interdisciplinary study project	16.7% (2/12)	75% (9/12)	8.3% (1/12)

Are there certain topics/tools/skills within the frame of LBS2ITS you would like Sri Lankan universities to teach their graduates?

Modern technology on surveying	Smart travelling system	Be life-long learners
Students should study Advance world technology ,Road construction and building construction , its better to inclide subjects that related to civil engineering related subjects its very useful for future works.		
Yes, strongly recommended for the graduates to teach this innovative technologies to enhance the qualities of day-to-day life of peoples with the modern and hitec implementation to the infrastructure of transportation of sri lanka.		
innovate	-	No idea X2
Yes	I think no	Yes

Would you characterise the knowledge of your graduates as interdisciplinary?
1. Yes   66.7% (8/12)
2. No   0%
3. Maybe 33.3% (4/12)

What are the most essential topics/tools/skills to be developed as part of the education?

Communication	Route analysis	Construction and civil engineering
Training	Positioning system	Practical experience
Accessibility and benefits of using location based services rather than the conventional methods which are existing in this sector.		
Need theoritical knowledge with practical experiences		
Practical tasks in the reel world not only the theory based		
Mobility concepts	Practical side	practical knowledge

Which skills do you consider to be potentially beneficial for the overall Sri Lankan society?

Education and communication	COMPUTER	Confident
LIS	Improve language skills	Traffic quality and safety

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Construction knowledge and civil engineering knowledge will be benifit for survey professionals bcz university studies only useful to survey department only so should develop skills in project handling and construction		
Using AI technologies, location based services with autonomous features in a emergency situations.		
Give some important for physical practical		
practical knowledge	Attitude	-

Do you have any other recommendations?

Should include subject in surveying it should help our professionals to get opportunity in Europe and other countries and same time they should study construction to work in srilanka also without experience		
Quick methodologies and techniques to obtain the system back from a system failure and alternative methods to maximise the efficiency of outputs while in a system failure with traditional design.		
Should facility to develop own abilities		
No X8	-	

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