Journal Publications (43)

1	**Kannimuthu S,** Dr. K. Premalatha, 'DISCOVERY OF HIGH UTILITY ITEMSETS USING GENETIC ALGORITHM WITH RANKED MUTATION', **Applied Artificial Intelligence, Taylor & Francis Journal**, Vol. 28, No. 4, 2014, pp. 337-359. **[SCI, Scopus Indexed, Impact Factor: 0.527, AU Annexure I]**
2	**Kannimuthu S,** Dr. K. Premalatha, 'A DISTRIBUTED APPROACH TO EXTRACT HIGH UTILITY ITEMSETS FROM XML DATA', World Academy of Science, Engineering and Technology, **International Journal of Computer, Information Science and Engineering**, Vol. 8, No. 3, 2014, pp. 460-468 **[SJR: 0.12- Scopus Indexed, AU Annexure II]**
3	**Kannimuthu S**, Dr. K. Premalatha& Dr. S. Shankar, "A NOVEL APPROACH TO EXTRACT HIGH UTILITY ITEMSETS FROM DISTRIBUTED DATABASES", **Computing and Informatics Journal, Vol**. 31, No. 6+, 2012, pp. 1597-1615. **[SCI, Scopus Indexed, Impact Factor-0.504, Annexure I].**
4	**Kannimuthu S,** Dr. K. Premalatha**,** "UP-GNIV: AN EXPEDITIOUS HIGH UTILITY PATTERN MINING ALGORITHM FOR ITEMSETS WITH NEGATIVE UTILITY VALUES", **International Journal of Information Technology and Management: InderScience Journal,** Vol. 14, No. 1, 2015, pp. 26-42 **[SJR: 0.16-Scopus Indexed, AU Annexure II]**
5	**Kannimuthu S,** Dr. K. Premalatha**,** "DISCOVERY OF HIGH UTILITY ITEMSETS USING GENETIC ALGORITHM", **International Journal of Engineering and Technology,** Vol. 5, No.6, 2013, pp.4866-4880.**[SJR: 0.18-Scopus Indexed, AU Annexure II]**
6	**Kannimuthu S**, Dr. K. Premalatha& Shankar S, "iFUM-IMPROVED FAST UTILITY MINING",**International Journal of Computer Applications, Vol. 27, No. 11, 2011, pp. 32-36.**
7	Shankar S , Dr.T.Purusothaman, **Kannimuthu S** , Vishnu Priya K , "A NOVEL UTILITY AND FREQUENCY BASED ITEMSET MINING APPROACH FOR IMPROVING CRM IN RETAIL BUSINESS", **International Journal of Computer Applications, Vol. 1, No. 16, 2010.**
8	Deepa S P, **Kannimuthu S,** Keerthika, "SECURITY USING COLORS AND ARMSTRONG NUMBERS", **IEEE Xplore**, **pp. 157-160, ISBN-978-1-61284-807-5,DOI-10.1109/NCOIET.2011.5738822.**
9	**S. Kannimuthu**, Dr. K. Premalatha and Dr. S. Shankar. "INVESTIGATION OF HIGH UTILITY ITEMSET MINING IN SERVICE ORIENTED COMPUTING: DEPLOYMENT OF KNOWLEDGE AS A SERVICE IN E-COMMERCE", **IEEE Xplore, ISBN-978-1-4673-5583-4, DOI: 10.1109/ICoAC.2012.6416812, 2012.**
10	Karthick Kannan, Deepa S.P, **Kannimuthu S**, "Wireless Tongue- Teeth Operated System for Physically Challenged People to Operate Computer", Proc. of Intl. Conf. on Advances in Computer Engineering
11	**Kannimuthu S,** Gunasekaran S, Roopa S 'Review on Hiding the Sensitive High Utility Itemsets', International Journal of Computer Applications (ISSN: 0975 – 8887), Vol. 119, No. 13, pp. 30-33
12	**Dr. Kannimuthu S,** Dr. K. Premalatha, Dr. G. Usha, 'Survey on Recent Developments in Utility based data mining', International Journal of Innovative Science, Engineering and Technology, Vol. 2, No. 9, pp. 894-901, 2015

13	K. Venkatachalam, Dr. N.K. Karthikeyan, **Dr. S. Kannimuthu,** 'Comprehensive Survey on Semantic Web Service Discovery and Composition', Advances in Natural and Applied Sciences, Vol. 10, No. 5, pp.32-40, 2016 **[SJR: 0.13- Scopus Indexed, AU Annexure II]**
14	G. Usha, **Dr. S. Kannimuthu,** M. Karthi, J. Joshua 'An Analytical Approach to Detect and Isolate Attacks in Mobile Adhoc Networks Using Cross Layer Feedback', Asian Journal of Information Technology, Vol. 15, No. 4, pp.694-702, 2016 **[SJR: 0.11- Scopus Indexed]**
15	Sreega S**, Dr. S. Kannimuthu**, Dr. K. Bhanu & Mrs. K. Bhuvaneshwari, "A Systematic Exposition of Internet of Things (IoT) and Security Issues", Middle East Journal of Scientific Research, Vol. 24, No. 9, pp. 2739-2751, 2016 [SJR:0.16]
16	P Arulprakash, P Sengottuvelan**, S Kannimuthu**, "Hybrid Fuzzy Logic based Proactive Energy Optimizing", Asian Journal of Research in Social Sciences and Humanities Vol. 6, No. 9, pp. 2082-2089, 2016.
17	G Usha, **S Kannimuthu**, "A Secured Cross Layer AODV Routing to Detect and Isolate Black Hole Attacks (SCLARDI) for MANET", TURKISH JOURNAL OF ELECTRICAL ENGINEERING & COMPUTER SCIENCES DOI: 10.3906/elk-1508-121, **[SCI, Scopus Indexed, Impact Factor: 0.518].**
18	**S. Kannimuthu**, C. K. Somesh, P. D. Mahendhiran, D. Bhanu and K. S. Bhuvaneshwari, "Certain Investigation on Significance of Internet of Things (IoT) and Big Data in Vehicle Tracking System", Indian Journal of Science and Technology, Vol 9, No. 39, 2016 **[SJR:0.27]**
19	S Sangeetha, S Kannimuthu, PD Mahendhiran, "Survey on Big Data Analytics and its Applications", International Journal of Computer Applications 153 (12), 2017
20	C Priyadharsini, S Kannimuthu, "An Intillegent Decision Making System for Flood Prediction", Asian Journal of Research in Social Sciences and Humanities 7 (2), pp. 195-207, 2017
21	G. Usha, S. Kannimuthu, M. Karthi, Gayathri Devi , "Survey of Single and Cross Layer Security in MANET", Indian Journal of Science and Technology, Vol. 9, No. 41, pp. 1-9, 2016 **[Scopus Indexed, SJR:0.27]**
22	G. Usha, **S. Kannimuthu**, D. Bhanu, K.S. Bhuvaneshwari and H. Karthikeyan,"Taxonomy of Worm Hole Attack Solutions in MANET", International Journal on Control Theory and its Applications, Vol. 9, No. 14, pp. 1101-1108, 2017 **[Scopus Indexed, SJR:0.53]**
23	R. Aishwarya, A.Gokulapriya&**Dr. S. Kannimuthu**, "Certain Investigation on graph Theory and its Applications", International Journal of Scientific Research, Vol. 6, No. 5, pp. 580-582, 2017.
24	C Priyadharsini, S Kannimuthu, "Polyhedron Model for three dimensional node deployments in Underwater Sensor Network", Journal of Computational and Theoretical Nanoscience, Vol. 14, No. 12, pp. 5858-5862 **[Scopus Indexed, SJR: 0.23, AU Annexure-I]**
25	P. D. Mahendhiran &**S. Kannimuthu**, "Deep Learning Techniques for Polarity Classification in Multimodal Sentiment Analysis", Int. J. Info. Tech. Dec. Mak. Vol. 17, No. 3, pp. 883-910, 2018. **[SCI, Scopus Indexed, Impact Factor: 1.664].**
26	Mrs. K.S. Bhuvaneshwari, D. Bhanu & S. Kannimuthu, "Probabilistic Variable Precision Fuzzy Rough Set Technique for Discovering Optimal Learning Patterns in E-learning", International Journal of Business Intelligence and Data Mining, Inderscience Journal, Vol. 14, No. 1-2, 121-137, 2019 **[Scopus Indexed, SJR: 0.19, AU Annexure-I]**

27	Dr. S. Kannimuthu& Dr. K. Premalatha, "Stellar mass black hole optimization for utility mining", International Journal of Data Analysis Techniques and Strategies, Inderscience Journal, Vol. 11, No. 3, 222-245, 2019. **[Scopus Indexed, SJR: 0.19, AU Annexure-I]**
28	PM Arunkumar, S Chandramathi, **S Kannimuthu**, "Sentiment analysis-based framework for assessing internet telemedicine videos", International Journal of Data Analysis Techniques and Strategies, Vol. 11, No. 4, pp. 328-336, 2019.**[Scopus Indexed, SJR: 0.19, AU Annexure-I]**
29	Chola Raja K, Kannimuthu S, "Certain Investigation on Cross Domain Data Fusion", International Journal of Applied and Pure Mathematics, Vol. 118, No. 10, pp. 1-7**[Scopus Indexed, SJR: 0.25]**.
30	Mahendiran PD, Kannimuthu S, N.V. Balaji, "Certain Investigation on Context Aware Computing", International Journal of Applied and Pure Mathematics, Vol. 118, No. 11, pp. 71-79 **[Scopus Indexed, SJR: 0.25]**.
31	Dr. P.M. Arunkumar, Dr. S. Kannimuthu, "Mining Big data streams using Business analytics tools: A bird's eye view on MOA and SAMOA", International Journal of Business Intelligence and Data Mining, Inderscience Journal **[Scopus Indexed, SJR: 0.19, AU Annexure-I]**
32	Sharmila Devi V, Kannimuthu S KCE_DAlab@CMEEIL-FIRE2017:Event Extraction using Support Vector Machines, **Proceedings of the 9th Forum for Information Retrieval Evaluation, FIRE-2017, IISc, Bangalore [Scopus Indexed]**
33	Usha G, **Kannimuthu S**, Mahendiran D, "A Static Analysis method for detecting Cross Site Scripting Vulnerabilities", International Journal of Information and Computer Security, Inderscience Journal **[Scopus Indexed, SJR: 0.14]**
34	Nithyanantham, S., **Kannimuthu S**, Analysis of security issues for the internet of vehicles in India, International Journal of Engineering and Technology(UAE), 7(1.3 Special Issue 3), pp. 181-186, 2018**[Scopus Indexed]**
35	Usha G and **Kannimuthu S** , Augmentation and Orchestration of Security Techniques in Fog Computing International Journal of Recent Technology and Engineering (IJRTE), Vol. 8, No. 2S4, pp. 143-148, 2019 **[Scopus Indexed]**
36	**Dr. S. Kannimuthu**, Dr. D. Bhanu, Dr. K.S. Bhuvaneshwari, "Performance Analysis of Machine Learning Algorithms For Dengue Disease Prediction Journal of Computational and Theoretical Nanoscience, Accepted for Publication **[Scopus Indexed]**
37	**Dr. S. Kannimuthu**, D. Gowtham Chakravarthy "Extreme gradient boost classification based interesting user patterns discovery for web service composition", Mobile Networks and Applications, Springer, Vol. 24, No. 6, pp. 1-13, **[SCI, Scopus, IF: 2.39]**
38	**Dr. S. Kannimuthu**, Dr. D. Bhanu, Dr. K.S. Bhuvaneshwari "A novel approach for agricultural decision making using graph coloring", SN Applied Sciences, Springer, Vol. 2, No. 31, 2020**[SCI].**
39	PM Arunkumar, **S Kannimuthu**, "Machine Learning Based Automated Driver-Behavior Prediction For Automotive Control Systems", Journal of Mechanics of Continua and Mathematical Sciences, Vol. 7, pp. 1-12, 2020 **[SCI]**.
40	G Usha, **S Kannimuthu**, PD Mahendiran, Anusha Kadambari Shanker, Deepti Venugopal, "Static analysis method for detecting cross site scripting vulnerabilities", Journal International Journal of Information and Computer Security, Vol.13, No.1, pp.32-47, 2020**[Scopus]**

41	D Gowtham Chakravarthy, **S Kannimuthu**, "Mining interesting actionable patterns for web service composition", Journal of Ambient Intelligence and Humanized Computing, pp. 1-7, 2020**[SCI]**
42	V Sharmila Devi, S Kannimuthu, G Ravikumar, M Anand Kumar, "KCE DALab-APDA@FIRE2019: Author Profiling and Deception Detection in Arabic using Weighted Embedding", Journal Working Notes of FIRE 2019 - Forum for Information Retrieval Evaluation, Vol. 2517, pp. 136-143 **[Scopus]**
43	Lavanya S, Mythili K, Kannimuthu S, "An Integration of Big Data Analytics and Cyber Security-A Panoramic Survey", International Journal of Advanced Research in Engineering and Technology (IJARET), Vol. 11, No.9, 2020, pp. 747-754 **[Scopus]**

Conference Publications (9)

1	Presented a paper titled **"Software Interface for Rainfall Animation Over Globe"** in a National Conference conducted by CSI College of Engineering, Ooty.
2	Presented a Paper titled **"Modeling a Network Intrusion Detection System using Random Forests"** in a National Conference on Information Technology conducted by Bangalore Institute of Technology, Bangalore
3	Presented a Paper titled **"Wireless Tongue- Teeth Operated System for Physically Challenged People to Operate Computer"** and it is published in Proc. of Int. Conf. on Advances in Computer Engineering 2011
4	Presented a Paper titled **"TQM:A Driving Force to Face Challenges in Technical Education"** at Anna University, Chennai, Madurai Region and it is published in Proc. of National. Conf. on Reaching the Unreached: A Challenge to Technical Education.
5	Presented a Paper titled **"Investigation of high utility itemsetmining in service oriented computing: deployment ofknowledge as a service in e-commerce",** in a International Conference on Advanced Computing (ICoAC-2012) conducted by Madras Institute of Technology (MIT), Chennai
6	Presented a Paper titled **"Certain Investigation on Cross Domain Data Fusion",** in a International Conference on Electrical and Electronics Instrumentation and Computer Communication conducted by Karpagam College of Engineering Coimbatore.
7	Presented a Paper titled **"Comprehensive Survey on Context Aware Computing",** in an International Conference on Electrical and Electronics Instrumentation and Computer Communication conducted by Karpagam College of Engineering Coimbatore.
8	Presented a Paper titled "**A Novel Approach for Agricultural Decision Making using Graph Coloring**" in an International Conference on IoT, Social, Mobile, Analytics and Cloud in Computational Vision and Bio-Engineering (ISMAC-CVB 2019) organized by Vivekananda College of Technology for Women, March 13-14, 2019.
9	Presented a Paper titled "**Augmentation and Orchestration of Security Techniques in Fog Computing**" in an International Conference on 4th International Conference on Artificial Intelligence and Evolutionary Computations in Engineering Systems organized by Dept. of Software Engineering, SRM Institute of Science and Technology, Chennai, April 11-13, 2019.

Journal/Book Review (13)

Journals	
1	Reviewer for JISE Journal –An International Journal of Information Science and Engineering.
2	Reviewer for Journal of Information Science.
3	Reviewer for Journal of Grid and Web services.
4	Reviewer for Applied Mathematics and Information Sciences.
5	Reviewer for Biomedical Research Journal.
6	Reviewer for WIRES Data Mining and Knowledge Discovery.
7	Reviewer for Applied Soft Computing.
8	Reviewer for Heliyon Journal.
9	Reviewer for Journal of Ambient Intelligence and Humanized Computing.
10	Reviewer for the Journal of Indian Geophysical Union
Books	
11	Reviewer for the book titled **"Object Oriented Programming with C++"**, E. Balagurusamy, Fifth Edition, Tata McGraw Hill Education.
12	Reviewer for the book title **"Mastering C"**, K.R. Venugopal & Sudeep R Prasad, Second Edition, Tata McGraw Hill Education.
13	Reviewer for the book title **"Mastering C++"**, K.R. Venugopal, Rajkumar, T. Ravishankar, Tata McGraw Hill Education.

Professional Membership (2)
- Lifetime member of Indian Society for Technical Education (ISTE). (LM-94315)
- Lifetime member of IAENG

Seminars/Workshops Organized

S. No	Programme	Date
1.	Organized **DRDO Sponsored** Two days National Level workshop on "Cloud Computing"	February 24-25, 2012
2.	Organized **DRDO Sponsored** Two days National Level workshop on "Data mining using SQL Server 2008 and Weka"	September 29-30, 2011
3.	Organized Two-day workshop on "J2ME and WSN"	August 26-27, 2011
4.	Organized Two-day workshop on "Software Testing"	August 11-12, 2010
5.	Organized Two-day Workshop on "Advanced Java Programming and Component Based Technology"	August 07-08, 2009
6.	Organized Two days internal Workshop on "Advanced Java Programming" at SKCET	June 15-16, 2009

7.	Organized One day internal Workshop on "Data Mining Tools" at CIET	8-Apr-14
8.	Organized One day internal Workshop on "Big Data Analytics" at CIET	30-Mar-15
9.	Organized One day internal Workshop on "Importance of Data Structures in Software Industry" at KCE.	13-Feb-16
10.	Organized **ISRO Sponsored** "Two Day Seminar on Deep Learning Models for Cyber Security and Remote Sensing" at KCE.	July 13-14, 2017
11	Organized **CSIR Sponsored** "Two Day Seminar on Recent Trends in Cognitive Machine Learning" at KCE.	August 29-30, 2019

Consultancy Project (1)

1) Done a project titled "**Bearing Information System**" for ZF-Wind Power Coimbatore Ltd, Coimbatore. ZF Wind Power is a globally established designer, manufacturer, and supplier of tailor-made gearboxes for wind turbines. I am responsible for developing the information system for **ZF Wind Power Antwerpen NV- Belgium Ltd** that will enable in,

- Storing bearing information like general, macro, supplier & mounting details,
- Controlling access to information and share information to any of the interested departments at ZF Wind Power Coimbatore Ltd.
- Generating the reports and providing the export facility to keep the bearing information.

Role : **Team Head**
Technology : **J2EE / MySQL**
Fund Released : **4 Lakhs**

Program Committee Member / Session In-charge for Conferences (5)

1. Programme Committee member for International Conference on Big Data and Advanced Wireless Technologies, American University in Bulgaria. Blagoevgrad, Bulgarie-2016.
2. Programme Committee member for the First International Workshop on Nature Inspired Computing for Optimization and Management NICOM, SOA University & Chairman, IIMT, Bhubaneswar, India.
3. Technical Programme Committee member for International Conference on Advanced Computing and Intelligent Engineering , 23-25 November, 2017, Central University of Rajasthan, Ajmer, India.
4. Technical Programme Committee member for 3rd International Conference on "Next Generation Computing Technologies" (NGCT-2017) School of Computer Science & Engineering University of Petroleum & Energy Studies Bidholi Campus, Dehradun Uttarakhand (INDIA).
5. Programme Committee member for International Conference on Recent Trends in Advanced Computing (ICRTAC-2020), VIT Chennai.

Seminars / Workshops Attended (18)

S. No	Programme	Date
1.	IBM Workshop on Open Source & Tools at SKCET	23-10-2007 & 24-10-2007
2.	Seminar on "Multi core Architectures" in PSG college of Technology Coimbatore	19-9-2007
3.	National Seminar on ERP Application's for Medium & Small Industries- Emerging Trends at SKCET	28-8-2008 & 29-8-2008
4.	One day Workshop on E-Learning at SKCET organized by CSI	2008-2009
5.	One day FDP on .NET Technologies SKCET organized by CSI	24-04-2009
6.	Five day Workshop on Open Source Tools at SKCET organized by Dept of CSE	26-6-2009 to 3-7-2009
7.	Five days Training programme on "Empowering Teachers for Enhancing SC/ST Students Employability" at KSR College of Technology, Tiruchengode organized by CUIC, Anna University Chennai and TAHDCO.	14-4-2010 to 18-04-2010
8.	Two Days FDP on "Theory of Computation" at CIET	27-06-2013 & 28-06-2013
9.	Two Days Workshop on "Android Programming" at CIET	27-09-2013 & 28-09-2013
10.	Two Days Workshop on "Research and Project Ideas in Data Mining using Rapid Miner at CIET	10-10-2013 & 11-10-2013
11.	Two Week ISTE Workshop on Computer Programming Conducted by IIT, Bombay	20-05-2014 to 15-06-2014 16-06-2014 to 21-06-2014
12.	One Day FDP on Qlik by CTS, Coimbatore	27-09-2017
13.	Three FDP on "A Refresher Experiential Course on Linear Algebra and Optimization for Modern Signal Processing and Pattern Classification", Amrita University	25-11-2017 to 27-11-2017
14.	Two Day FDP on "Hands-on Training Programme on MACHINE LEARNING BASICS" using PYTHON at MIT Chennai	19.09.2018 & 20.09.2018
15.	Three Day Academic Leadership Workshop (TalentNext) at Wipro Limited, Electronic City, Bangalore	08.04.2019-10.04.2019
16.	Successfully Completed the NPTEL Course (Elite) "Programming, Data structures and Algorithms using Python" conducted by IITM, Chennai	28.11.2018-31.11.2019 (8 Weeks)

17.	Successfully Completed the NPTEL Course (Elite) "Machine Learning for Science and Applications" conducted by IITM, Chennai	26.12.2018-19.04.2019 (12 Weeks)
18.	Successfully Completed the NPTEL Course (Elite+Gold& Top 1%) "Programming in Java" conducted by IIT Kharagpur	31.08.2019-23.10.2019 (12 Weeks)

PERSONAL DETAILS

Date of Birth	:	9th November 1983
Gender	:	Male
Father's Name	:	Mr. K.Subramanian
Mother's Name	:	Mrs. S.Rajeshwari
Nationality	:	Indian
Languages known	:	English, Tamil
Marital Status	:	Married
Spouse Name	:	K.R. Gayathri
Daughter Name	:	K.G. Rohini Kirthika

COURSES HANDLED

S. No	Class	Year	Name of the Course	Pass Percentage
1	IV BTech IT	2007	Component Based Technology	96
2	IV BTech IT	2008	Web Technology	94
3	III B.Tech IT	2008	Network Programming and Management	93.33
4	IV BTech IT	2008	Data mining and Warehousing	100
5	IV BTech IT	2009	Component Based Technology	95.45
6	II BTech IT	2009	Design and Analysis of Algorithms	95.45
7	IV B.Tech IT	2009	Software Testing	100
8	IV BTech IT	2009	Component Based Technology	97.95
9	III BTech IT	2010	Database Management System	96.87
10	II BTech IT	2010	Database Management System	96.97
11	IV BTech IT	2010	Enterprise Computing	98.45
12	IV BTech IT	2010	Advanced Java Programming	95.45
13	IV BTech IT	2011	Component Based Technology	100
14	IV BTech IT	2011	Software Project Management	100
15	IV BTech IT	2011	Web Technology	96.72
16	I BE ECE	2011	Fundamentals of Computing and C Programming	95.16
17	IV BTech IT	2012	Professional Ethics	100
18	II BTech IT	2012	Database Management System	89
19	II BTech IT	2012	Object Oriented Programming	94.20
20	I BTech IT	2012	Fundamentals of Computing	94.64
21	II BE EEE	2013	Object Oriented Programming	95
22	III BTech IT	2013	Data Warehousing and Data Mining	100
23	III BE CSE	2013	Software Engineering	94.82

24	IV BE CSE	2013	Internet Programming	91.42
25	IV BE CSE	2014	Open Source Tools and Components	92.80
26	I ME CSE	2014	Principles of Programming Languages	93.34
27	II B.E CSE	2014	Programming Data Structures II	89.18
28	II B.E ECE	2014	Object Oriented Programming and Data Structures	90.15
29	III B.E CSE	2015	Web Technology	90
30	IV B.E CSE	2015	Indian Constitution and Society	93.34
31	II B.E CSE	2015	Data Structures	88.5
32	II B.Tech IT	2015	Data Structures	89.09
33	II B.E CSE	2016	Advanced Data Structures	100
34	III B.Tech IT	2016	Code Optimization Techniques	100
35	II B.E CSE	2016	Data Structures	98.46
36	II B.E EEE	2016	Data Structures	100
37	II B.E CSE	2017	Advanced Data Structures	100
38	II B.E EEE	2017	Advanced Data Structures	100
39	II B.E MECH	2017	Data Structures	100
40	II B.E CSE	2017	Data Structures	100
41	II B.TECH IT	2017	Advanced Data Structures	100
42	II BE-All Departments	2018	Design and Analysis of Algorithms	100
43	III BE-All Departments	2018	Machine Learning Techniques	99.5
44	II BE-All Departments	2018	Advanced Algorithms	98
45	II B.Tech IT	2019	Data Structures	94
46	II B.E ECE	2019	Data Structures	100