

Gauging Usage of E-Journals Database of American Chemical Society at Guru Jambheshwar University of Science & Technology, Hisar

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Abstract

The research is one of the prime purpose of any university / Institute of higher learning. The journals are the primary source of information for any academic research and results thus reported in journals become the ingredient for further research. These information resources have become more valuable with the emergence of electronic journals and quality research without electronic journals hardly has any existence. The INFLIBNET under its e-ShodhSindhu project has provided the access of electronic resources from 19 publishers to Guru Jambheshwar University of Science & Technology (GJUST) Hisar. The present study is carried out with the objective to know and compare the month-wise usage of American Chemical Society database during the period of 2011 to 2016. The study reports that the yearly highest and lowest use whereas month-wise highest and lowest use of database is also reported. Study reveals that 'Journal of Medicinal Chemistry' is most used Journal of the database and its usage stands 1st in all the years except 2016. Study highlights all such journals out of which more than 100 articles have been retrieved annually. Some suggestions have been reported to enhance the use of electronic journals.

Keywords: Electronic Journals; eShodhSindhu; American Chemical Society.

Introduction

Guru Jambheshwar University of Science & Technology, Hisar is a State Technical University of Haryana came in to existence on October 20, 1995. The National Assessment and Accreditation Council (NAAC) has accredited the University 3rd time with 'A' grade. The NAAC has also endorsed UGC-Human Resource Centre of the University as No. 1 in the Country. The National Institute Ranking Framework (NIRF) also accredited 24th rank among the Universities/Institutes in India. The faculty of the university has published more than 2000 papers in various peer reviewed journals of national and international repute since 2009-10. Out of these publications, 1637 publications are listed on Scopus

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with about 19000 citations. As per Scopus database, the H-Index of the faculty is more than 60, while the Impact Factor of the papers is more than 34.

The American Chemical Society database of e-journals is actually used by the researchers of the departments of Chemistry, Bio and Nanotechnology, Food Engineering, Environmental Sciences & Engineering, Printing Technology, Pharmaceutical Sciences etc. and is considered very important database.

Review of Literature

Since last two decades, many studies have been made to gauge the usage level and usage pattern of electronic journals by the scholars in universities. Some of relevant studies have been discussed as under:

Log studies have been particularly helpful in understanding the searching and browsing behaviour of e-journals' users (Jamali, Nicholas, and Huntington, 2005).

The COUNTER Journal Report 1 has been used in a UK study of online usage of journals from several

publishers by a number of university library customers. Shepherd (2006).

Shearer, Klatt and Nagy (2009) carried out a study of electronic journal usage data and analysed the journals used as 0-24 times, 25-49 times, 50 to 99 times, 100-199 times and 200+ times.

Suseela, V.J., (2011) remarked that the latest method to measure the usefulness of journals is the use of log files which are referred to as usage statistics or usage reports. These analysed usage statistics can support in the complex decision making activity of serials management in university libraries.

Chowdhury (2012) analyzed the usage trend of e-journals in Independent University, Bangladesh (IUB) and observed that use of Emerald database is more rational as compared to other three databases. He highlighted the list of 25 journals each of Oxford University Press, JSTOR, ABI/Inform and Emerald databases. It is further stressed that more consortia may be formed for exploring more electronic resources at an affordable price and higher education libraries, at least, will then find more users.

Moorthy and Pant (2012) observed that the download statistics and its usage analysis has shown that the scientists of DRDO is utilizing the resources in a positive way and in some cases, where usage of e-journals is low, training programmes are conducted from time to time. To analyze the usability of DRDO E-journals Consortium, the usage statistics for the period from 2009 to 2011 was collected for all the DRDO Labs from the websites of 8 publishers. They further stated that each library of DRDO labs has accessibility of DESIDOC resources through a well and dedicated intranet. DRDO e-journals Consortium has strengthened the resource sharing and provided information on 24X7 bases with improved quality and quantity.

Tripathi and Jeevan (2013) highlighted the importance of qualitative and quantitative analysis of the usage of e-resources in academic libraries. The decision for the subscription or cancellation for the already subscribed journals has to be taken very cautiously. To take the right decision, library authorities may consider usage statistics. The number of full-text downloads could be considered as the most useful statistic for assessing the use of electronic resources as it justifies the significance of a particular Journal.

Tripathi and Kumar (2014) have the views that the quantitative analysis of numbers of downloads of e-resources from databases at JNU reflects continuous increase in number of downloads across all the databases during the period of the investigation. Use

of databases has improved gradually with every passing year. This may be attributed to the training, orientation programme conducted by the library.

Objectives

This study is basically concerned to study the usage pattern of electronic journals published by American Chemical Society. The study may help the decision makers of the university to ponder the use and reputation of journals. The objectives of the study are:-

- To know and compare the month-wise usage of American Chemical Society database during the period of 2011 to 2016.
- To know the journals out of which more than 100 articles have been retrieved per annum.
- To find out the journals out of which more than 100 articles have been retrieved annually in all the six years.
- To give possible suggestions, if required.

Methodology

The present study is carried out by taking the month-wise downloaded data for the year 2016. The data has been obtained from the eShodhSindhu Consortium. The data has been sorted and presented in tabulated form and also presented graphically.

American Chemical Society

The period and number of journals in the database is observed as under:-

Year	American Chemical Society
2011	45
2012	46
2013	49
2014	50
2015	52
2016	54

The access of electronic journals from American Chemical Society is provided to Guru Jambheshwar University by the INFLIBNET Centre, Ahmedabad. The month-wise details of downloaded article during the six years i.e. 2011 to 2016 have been shown in Fig. 1 and Table 1.

Table 1: Month-wise Usage of ACS during Six Years

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Avg.	Total
2016	385	192	370	439	258	253	521	501	456	344	410	434	380	4563
2015	244	815	465	545	537	279	544	591	631	484	202	237	465	5574
2014	278	197	262	254	273	229	314	261	363	178	338	311	272	3258
2013	262	175	258	342	400	216	578	586	400	255	182	396	338	4050
2012	721	600	462	319	404	455	675	465	287	335	306	296	444	5325
2011	301	1249	423	420	691	258	984	845	622	214	254	671	578	6932
Total	2191	3228	2240	2319	2563	1690	3616	3249	2759	1810	1692	2345	2475	29702
Avg.	365	538	373	387	427	282	603	542	460	302	282	391	413	4950

Table 2: Month-wise retrieval more than 100 articles (2011)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Medicinal Chemistry	22	233	28	32	111	15	466	353	169	37	76	208	1750
The Journal of Organic Chemistry	49	265	12	12	98	29	81	121	66	26	20	87	866
Journal of Agricultural and Food Chemistry	40	107	142	114	40	40	79	35	27	11	21	24	680
Journal of the American Chemical Society	28	121	26	39	84	28	42	120	70	12	22	47	639
Chemical Reviews	15	51	21	27	10	4	34	38	55	25	5	34	319
Organic Letters	20	60	7	5	47	2	43	14	21	7	6	35	267
The Journal of Physical Chemistry B	15	13	18	43	69	5	15	12	2	4	8	7	211
Analytical Chemistry	7	26	10	16	28	5	24	16	8	3	2	13	158
Biochemistry	3	77	1	3	9	0	20	10	4	1	6	5	139
The Journal of Physical Chemistry C	11	4	7	8	27	11	11	16	4	15	8	12	134
Macromolecules	5	13	16	3	4	15	2	3	34	12	1	15	123
Langmuir	14	6	18	15	12	13	6	3	7	3	5	14	116
Inorganic Chemistry	2	38	2	1	8	0	16	20	9	8	2	9	115
Chemistry of Materials	14	15	4	4	16	3	8	4	11	12	15	7	113
Environmental Science & Technology	2	0	13	2	19	26	15	3	19	0	4	9	112
ACS Combinatorial Science	4	34	3	1	7	0	12	11	5	3	1	26	107
Total	251	1063	328	325	589	196	874	779	511	179	202	552	5849

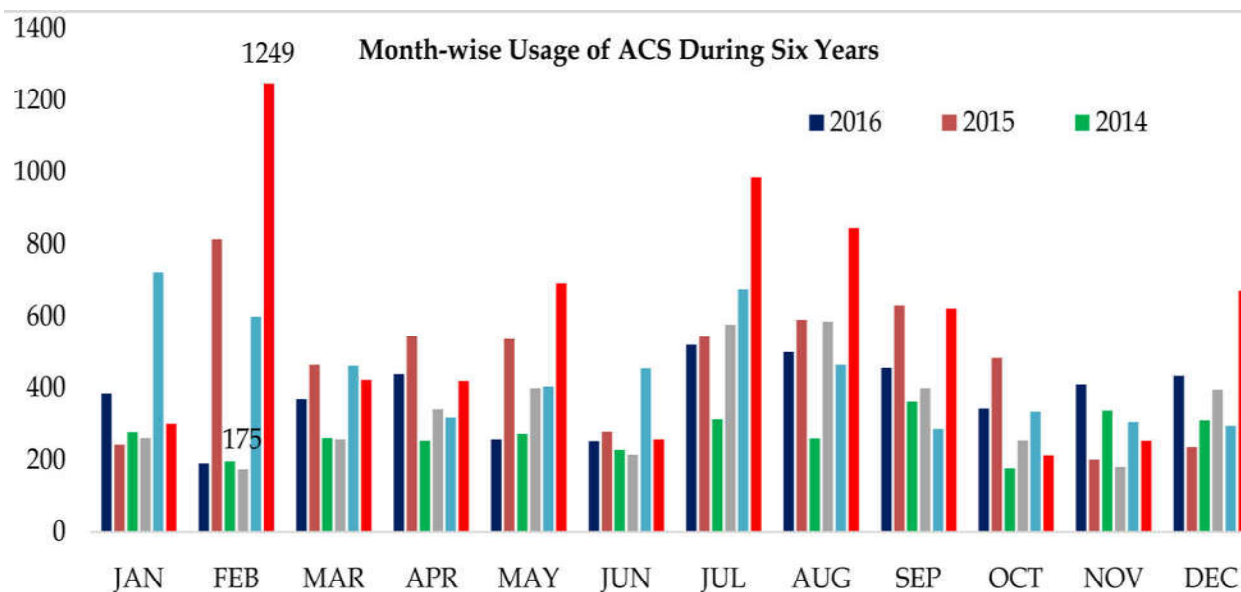


Fig. 1:

Fig. 2:

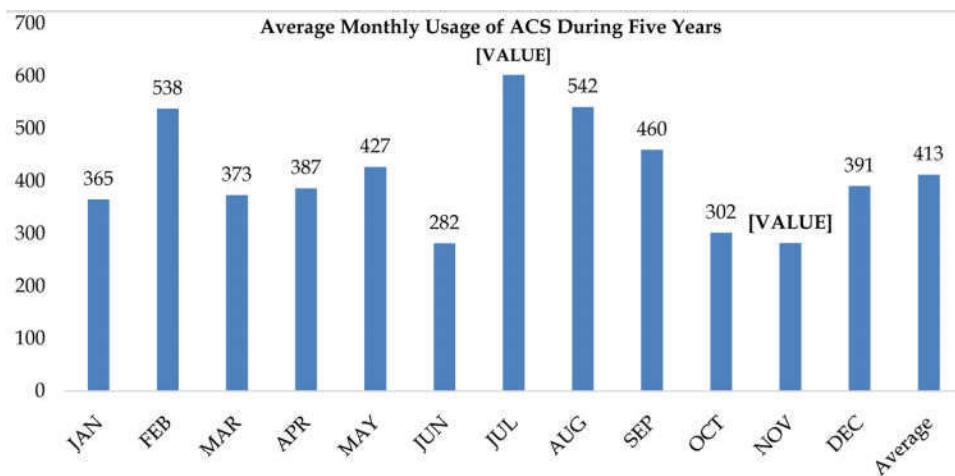
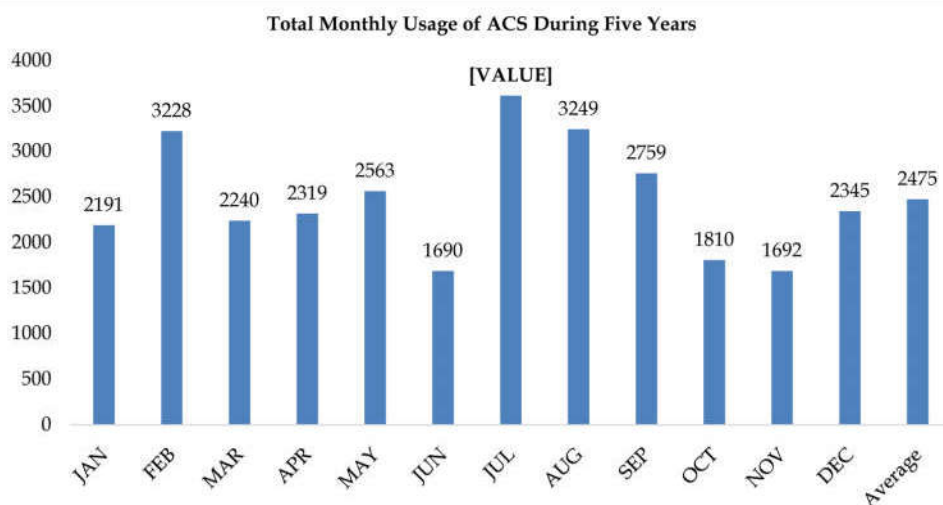


Fig. 3:



It has been shown in table 1 that total 29702 articles have been retrieved by the researchers of GJUST, Hisar from the database of American Chemical Society during the last 6 years. Highest number of 6932 and lowest number of 3258 articles have been observed in the years of 2011 and 2014 respectively against the average of 4950 articles per year. It is further observed that highest number of 3616 and lowest number of 1690 articles have been downloaded during the months of July and June respectively against the overall average of 2475 articles per month. In a particular month, highest 1249 and lowest 175 articles have been observed in the month of February 2011 and February 2013 respectively. The highest use of the database has been observed in the year 2011 whereas the lowest use in the year 2014.

Monthly average usage of ACS observed during the last six years have been shown in figure 2 where highest average of 603 and lowest average of 282 articles have been perceived in the month of July and

June & November respectively against the overall monthly average of 413 articles. Monthly average has observed more than 600 articles only in the month of July and. 282 articles i.e. less than 300 in the months of June and November.

Figure 3 has presented the total monthly usage of ACS during the six years. The highest 3616 and lowest 1690 total monthly articles have been perceived in the months of July and June respectively against the overall monthly total average of 2475 articles. Monthly average of more than 3000 articles have been observed in three months namely July, August and February whereas less than total 2000 articles per month have been observed in three months i.e. June (1690), November (1692) and October (1810). Monthly average in rest of six months have been observed in the range of 2000 to 3000 articles.

It is shown in Table 2 that during the year 2011, there are 16 such journals where more than 100 articles have been retrieved and annual total retrievals

from these journals is 5849 articles. Highest number of 1750 articles have been retrieved from 'Journal of Medicinal Chemistry' followed by 'The Journal of Organic Chemistry' (866 articles) and 'Journal of Agricultural and Food Chemistry' (680 articles) respectively. While observing the month-wise usage, it is found that highest (1063) and lowest (179) number of articles have been retrieved during the months of February and October respectively. It is further observed that from a particular journal, highest number of 466 articles have been retrieved from

'Journal of Medicinal Chemistry' in the month of July. During the year 2011, total 6932 articles have been retrieved out from 45 journals out of which 5849 articles have been retrieved only from 16 journals.

It has been observed from Table 3 that only 4192 articles have been retrieved from 12 such journals where more than 100 articles have been retrieved annually in the year 2012. Highest 551 articles have been observed in the month of January followed by 514 articles in the month of July. Less than 500 articles have been observed in the rest of the months and

Table 3: Month-wise retrieval more than 100 articles (2012)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Medicinal Chemistry	178	70	42	35	53	77	215	111	54	25	32	58	950
The Journal of Organic Chemistry	84	42	66	67	60	37	67	57	63	70	63	62	738
Journal of Agricultural and Food Chemistry	101	162	48	44	38	34	52	33	19	43	4	36	614
Journal of the American Chemical Society	69	48	67	62	41	67	44	57	36	42	50	23	606
Analytical Chemistry	21	14	23	3	18	74	24	12	9	9	13	1	221
Organic Letters	20	10	13	20	8	9	19	20	10	8	45	8	190
Chemical Reviews	14	23	13	11	10	15	19	18	12	11	19	5	170
Chemistry of Materials	13	28	26	7	15	20	10	14	1	23	3	5	165
The Journal of Physical Chemistry C	9	35	25	4	11	25	12	7	8	12	2	11	161
The Journal of Physical Chemistry B	21	23	25	6	12	8	10	16	5	16	1	5	148
Langmuir	19	6	3	6	22	9	8	6	6	10	4	28	127
Bio-macromolecules	2	29	3	2	4		34	10	1	7	5	5	102
Total	551	490	354	267	292	375	514	361	224	276	241	247	4192

Table 4: Month-wise retrieval more than 100 articles (2013)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Medicinal Chemistry	18	11	65	37	89	17	228	202	42	55	30	149	943
The Journal of Organic Chemistry	27	18	47	80	25	31	45	55	46	26	8	41	449
Journal of the American Chemical Society	39	21	18	59	40	18	36	67	51	31	14	22	416
Journal of Agricultural and Food Chemistry	39	25	38	14	24	23	52	35	42	23	57	30	402
Organic Letters	20	18	3	49	19	27	7	14	12	15	2	18	204
Langmuir	3	12	13	0	8	1	20	17	12	15	11	30	142
Inorganic Chemistry	4	4	9	18	44	10	11	10	11	10	3	6	140
Chemical Reviews	9	3	6	12	13	4	16	21	23	9	10	5	131
Total	159	112	199	269	262	131	415	421	239	184	135	301	2827

Table 5: Month-wise retrieval more than 100 articles (2014)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Medicinal Chemistry	81	27	13	28	65	19	57	28	40	27	87	75	547
Journal of Agricultural and Food Chemistry	41	17	25	34	30	20	36	101	50	11	26	26	417
Journal of the American Chemical Society	29	35	30	20	32	18	6	12	37	4	40	27	290
The Journal of Organic Chemistry	17	32	23	23	10	31	28	20	22	14	26	34	280
Organic Letters	12	23	21	2	11	35	8	5	7	4	14	19	161
Chemical Reviews	15	5	16	24	16	6	6	5	12	2	30	13	150
Langmuir	4	1	47	3	13	6	5	1	23	4	6	7	120
Chemistry of Materials	7	0	3	11	5	3	6	11	34	6	7	18	111
Total	206	140	178	145	182	138	152	183	225	72	236	219	2076

Table 6: Month-wise retrieval more than 100 articles (2015)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Medicinal Chemistry	32	326	127	71	51	23	125	119	34	20	6	10	944
Journal of Agricultural and Food Chemistry	47	51	50	80	45	36	42	54	54	44	12	17	532
The Journal of Organic Chemistry	23	75	33	86	87	21	55	38	29	25	20	14	506
Journal of the American Chemical Society	22	57	36	43	50	13	31	51	46	55	26	22	452
Chemical Reviews	6	19	39	27	91	23	25	54	38	81	6	20	429
Organic Letters	7	13	17	31	23	28	8	21	18	22	20	7	215
Analytical Chemistry	8	5	8	13	30	25	15	22	18	26	24	8	202
ACS Applied Materials & Interfaces	5	9	15	6	8	5	17	16	45	32	0	20	178
Langmuir	8	6	11	5	10	7	24	21	34	20	5	5	156
Industrial & Engineering Chemistry Research	5	9	6	6	7	7	13	8	47	17	10	8	143
Inorganic Chemistry	5	26	2	12	9	6	17	10	33	6	1	16	143
The Journal of Physical Chemistry C	3	12	14	2	17	5	5	6	28	15	10	13	130
Chemistry of Materials	5	15	4	16	4	10	14	15	14	13	4	8	122
Environmental Science & Technology	10	13	3	8	5	9	12	6	26	18	3	7	120
Total	186	636	365	406	437	218	403	441	464	394	147	175	4272

Table 7: Month-wise retrieval more than 100 articles (2016)

Journal	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
Journal of Agricultural and Food Chemistry	28	31	51	48	64	48	50	54	60	30	18	16	498
Journal of the American Chemical Society	33	22	19	32	16	19	60	54	40	35	58	63	451
Journal of Medicinal Chemistry	20	2	15	80	9	10	35	73	18	16	28	41	347
Chemical Reviews	25	21	23	25	9	9	24	46	43	41	33	30	329
The Journal of Organic Chemistry	18	5	42	30	27	17	44	26	27	11	11	39	297
Organic Letters	19	0	34	20	7	3	39	20	32	3	19	31	227
ACS Applied Materials & Interfaces	25	5	22	21	6	15	17	18	25	26	22	21	223
Inorganic Chemistry	9	7	22	22	8	6	20	9	25	25	26	16	195
The Journal of Physical Chemistry C	33	9	8	6	9	15	16	7	13	6	27	30	179
Analytical Chemistry	5	6	12	10	10	9	14	22	13	11	29	9	150
Chemistry of Materials	14	10	10	15	9	8	18	12	8	15	13	18	150
Langmuir	16	7	9	12	9	9	12	25	12	9	8	9	137
Industrial & Engineering Chemistry Research	15	8	7	21	3	3	14	14	18	13	4	4	124
The Journal of Physical Chemistry B	12	8	21	9	6	5	17	6	4	7	9	3	107
Total	272	141	295	351	192	176	380	386	338	248	305	330	3414

lowest 224 articles in the month of September. It is observed that none of the 12 journals have more than 1000 retrievals. Maximum 950 articles have been downloaded from the “Journal of Medicinal Chemistry”. Only four journals have the total downloads of more than 600 articles. Only one journal has total downloads of more than 200 articles and the rest of 7 journals have retrievals in the range from 100 to 200 articles. During the year 2012, total 5325

articles have been retrieved from 46 journals out of which 4192 articles have been retrieved only from 12 journals.

From the Table 4, it has been observed that none of the journals have more than 1000 retrievals. Maximum 943 articles have been retrieved from the “Journal of Medicinal Chemistry”. Only four journals have total downloads of more than 200 but less than 500 articles and the rest of 3 journals have downloads in the range

Table 8: List of Journals Annual Retrieval Higher Than 100 Articles

Journal (2011)	Total	Journal (2012)	Total	Journal (2013)	Total	Journal (2014)	Total	Journal (2015)	Total	Journal (2016)	Total
Journal of Medicinal Chemistry	1750	Journal of Medicinal Chemistry	950	Journal of Medicinal Chemistry	943	Journal of Medicinal Chemistry	547	Journal of Medicinal Chemistry	944	Journal of Agricultural and Food Chemistry	498
The Journal of Organic Chemistry	866	The Journal of Organic Chemistry	738	The Journal of Organic Chemistry	449	Journal of Agricultural and Food Chemistry	417	Journal of Agricultural and Food Chemistry	532	Journal of the American Chemical Society	451
Journal of Agricultural and Food Chemistry	680	Journal of Agricultural and Food Chemistry	614	Journal of the American Chemical Society	416	Journal of the American Chemical Society	290	The Journal of Organic Chemistry	506	Journal of Medicinal Chemistry	347
Journal of the American Chemical Society	639	Journal of the American Chemical Society	606	Journal of Agricultural and Food Chemistry	402	The Journal of Organic Chemistry	280	Journal of the American Chemical Society	452	Chemical Reviews	329
Chemical Reviews	319	Analytical Chemistry	221	Organic Letters	204	Organic Letters	161	Chemical Reviews	429	The Journal of Organic Chemistry	297
Organic Letters	267	Organic Letters	190	Langmuir	142	Chemical Reviews	150	Organic Letters	215	Organic Letters	227
The Journal of Physical Chemistry B	211	Chemical Reviews	170	Inorganic Chemistry	140	Langmuir	120	Analytical Chemistry	202	ACS Applied Materials & Interfaces	223
Analytical Chemistry	158	Chemistry of Materials	165	Chemical Reviews	131	Chemistry of Materials	111	ACS Applied Materials & Interfaces	178	Inorganic Chemistry	195
Biochemistry	139	The Journal of Physical Chemistry C	161	Total	2827	Total	2076	Langmuir	156	The Journal of Physical Chemistry C	179
The Journal of Physical Chemistry C	134	The Journal of Physical Chemistry B	148	-	-	-	-	Industrial & Engineering Chemistry Research	143	Analytical Chemistry	150
Macromolecules	123	Langmuir	127	-	-	-	-	Inorganic Chemistry	143	Chemistry of Materials	150
Langmuir	116	Biomacromolecules	102	-	-	-	-	The Journal of Physical Chemistry C	130	Langmuir	137
Inorganic Chemistry	115	Total	4192	-	-	-	-	Chemistry of Materials	122	Industrial & Engineering Chemistry Research	124
Chemistry of Materials	113	-	-	-	-	-	-	Environmental Science & Technology	120	The Journal of Physical Chemistry B	107
Environmental Science & Technology	112	-	-	-	-	-	-	Total	4272	Total	3414
ACS Combinatorial	107	-	-	-	-	-	-	-	-	-	-
Total	5849										

Table 9: List of Journals Annual Retrieval Higher Than 100 Articles in All Six Years

Journal	2011	2012	2013	2014	2015	2016	Total	Rank
Journal of Medicinal Chemistry	1750	950	943	544	947	347	5481	1.
Journal of Agricultural and Food Chemistry	680	614	402	417	532	498	3143	2.
The Journal of Organic Chemistry	866	738	449	280	506	297	3136	3.
Journal of the American Chemical Society	639	606	416	290	452	451	2854	4.
Chemical Reviews	319	170	131	150	429	329	1528	5.
Organic Letters	267	190	204	161	215	227	1264	6.
Langmuir	116	127	142	120	156	137	798	7.
Average	662	485	384	280	462	327	2601	
Total	4637	3395	2687	1962	3237	2286	18204	

of 100 to 200 articles. Out of the total 8 journals, that have total downloads of more than 100 articles during the year 2013, total 2827 articles have been downloaded with a maximum 415 and minimum 112 in the months of July and February respectively. During the year 2013, total 4050 articles have been retrieved out from 49 journals out of which 2827 articles have been retrieved only from 8 journals.

During the year 2014, as shown in the Table 5, all such 8 journals where more than 100 articles have been retrieved, decreased by one third of articles in the year 2011 and about half of the year 2012. Only 2076 downloads of articles have been observed from such 8 journals with maximum 236 and minimum 72 articles in the months of November and October respectively. Further, more than 500 articles have been retrieved from "Journal of Medicinal Chemistry" whereas more than 200 and less than 500 articles have been retrieved from 3 journals. Four journals are such that has total retrieved of more than 100 but less than 200 articles. During the year 2014, total 3258 articles have been retrieved out from 50 journals out of which 2076 articles have been retrieved only from 8 journals.

It is shown in Table 6 that during the year 2015, there are 14 such journals where more than 100 articles have been retrieved and annual total of downloads from these journals is 4272 articles. Highest number of 944 articles have been downloaded from 'Journal of Medicinal Chemistry' followed by 'Journal of Agricultural and Food Chemistry' and 'The Journal of Organic Chemistry' having 532 and 506 articles respectively. No other journal has the total downloads of more than 500 articles. Total 7 journals have downloads in the range of 100 to 200 articles, 2 in 200 to 300 and 2 in 400 to 500. While observing the month-wise usage, it is found that highest (636) and lowest (147) number of articles have been retrieved during the months of February and November respectively. It is further observed that from a particular journal, highest number of 326 articles have been retrieved from the 'Journal of Medicinal Chemistry' in the month of February. During the year 2015, total 5574 articles have been retrieved from 52

journals out of which 4272 articles have been retrieved only from 14 journals.

It has been observed from Table 7 that during the year 2016, total 3414 articles downloaded from 14 such journals where more than 100 articles have been downloaded. Highest 386 articles have been observed in the month of August following by 380 articles in the month of July. Further, 351, 338, 330 and 305 articles have been observed in the months of April, September, December and November respectively. Lowest 141 articles have been witnessed in the month of February. It is observed that, in total, maximum 498 articles have been downloaded from "Journal of Agricultural and Food Chemistry" followed by 451 articles from "Journals of American Chemical Society". From none of the 14 journals, total retrieval is more than 500 articles. During the year 2016, total 4563 articles have been retrieved from 54 journals out of which 3414 articles have been retrieved only from 14 journals.

Table 8 represents year-wise all such journals out of which more than 100 articles have been retrieved whereas Table 9 has shown total and year-wise 7 journals out of which more than 100 articles have been retrieved in all the six years.

Out of these 7 journals total 18204 articles have been retrieved at an annual average of 2601 articles. Journal of Medicinal Chemistry is one out of which more than 5000 articles have been downloaded whereas out of 'Langmuir' less than 1000 articles have been retrieved. The remaining 5 journals ranges from 1000 to 4000 articles per year. Further maximum 4637 and minimum 1962 articles have been observed in the years 2011 and 2014 respectively.

Suggestions

The university has the access of more than 8000 e-journals to meet the informational requirement of the users. The faculty members of the university have been provided computer systems/laptops with internet connection in their respective rooms in the teaching departments. University has more than 1000 nodes

with internet connections and 2 leased lines of IGBPS and 16 MBPS respectively and has Wi-Fi connectivity but there is need to give attention on some points such as:-

- It has been observed that even most of the research scholars do not turn towards library, because of any reason, for user education programmes being conducted by the library. Many research scholars passed out for their Ph. D. without consulting the library resources. Ali and Nisha (2011) suggested to start a course on the proper use of information resources in Delhi University as part of M.Phil. and Ph. D. programmes. The CCSHAU, Hisar has also introduced such course for the Ph.D. scholars. On the same pattern, a course should also be introduced in the Guru Jambheshwar University of Science & Technology, Hisar for the Master Degree and Ph. D. scholars.
- There is urgent need for conducting the user awareness program to train the users in searching and downloading the required article. Since good infrastructural facilities are available in the university, there is dire need to motivate the users to use these resources. Such user awareness programs shall be helpful in imparting training and motivating the scholars for using electronic resources.
- More access point should be made available for the research scholars equipped with latest facility in the respective departments.
- The Wi-Fi connectivity available in the campus need to be strengthened.
- Centralized internet labs need to be strengthened.
- More e-journals databases, including the Science Direct, should be provided in the university.

Conclusion

The usage level of American Chemical Society database is ordinary in Guru Jambheshwar University of Science & Technology and about 10 journals are used prudently. It is remarkably observed that total 29407 articles have been perceived out of about 50 journals during all the six years whereas total 18204 articles have been retrieved only from 7 such journals out of which annual retrieval is more than 100 articles in all six years. Journal of Medicinal Chemistry, Journal of Agricultural and Food Chemistry and, The Journal of Organic Chemistry, are three highly used journals and 11760 articles have been retrieved out of these journals during the 6 years.

The university and library authorities need to initiate some operative steps in order to further enhance the usage level. Most important such steps include to strengthen the Wi-Fi facility, to conduct more user awareness programmes for the researchers, and to start a new course on use of information resources for Ph.D. and Master Degree scholars. The result of the study shall be forwarded to the departments using the database of American Chemical Society to review.

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